Solar pump

Solar pump can be required to energize water flow when solar thermal system is installed.

How to wire solar pump

Follow below procedures step 1 ~ step 4.

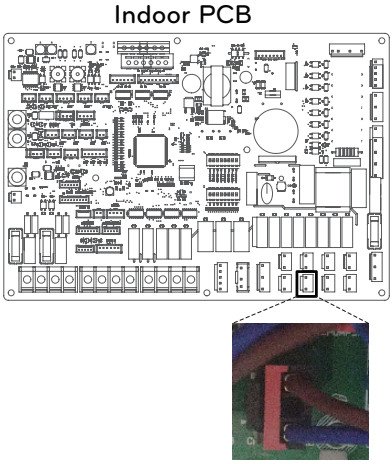
Step 1. Check if the power of the unit is turned off.

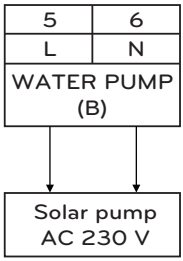
Step 2. Disassemble front panels and distinguish control box(Indoor) of the unit.

Step 3. Check if the harness(Black) is inserted fully to the indoor unit PCB (CN_W_PUMP_B).

Step 4. Connect the external pump to terminal block 1(4/5).

※ It is possible to un-use solar pump depending on instal environment.





⚠ CAUTION

When connecting a pump of 1.05A or higher, its output must be used as a signal line only.

External pump

External pump can be required when the room to take floor heating is too large or not well-insulated.(potential free) Also, External pump is installed with buffer tank to retain sufficient capacity.

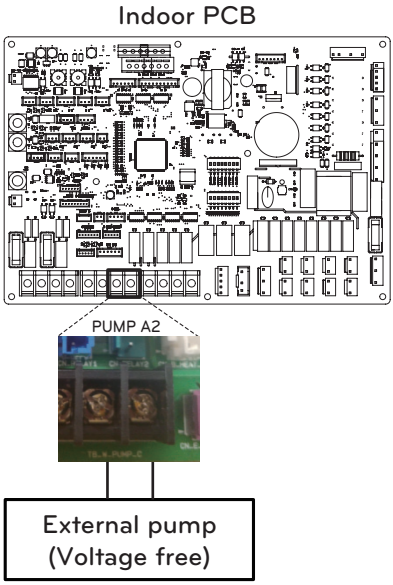
How to wire external pump

Follow below procedures step 1 ~ step 3.

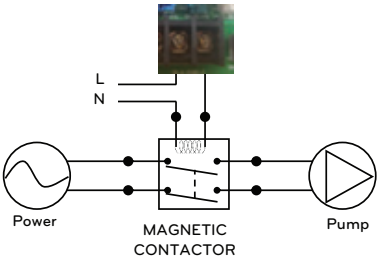
Step 1. Check if the power of the unit is turned off.

Step 2. Disassemble front panels and distinguish terminal block in Indoor PCB.

Step 3. Connect signal cable to terminal block fully.



How to install Voltage Free

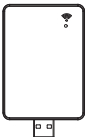


Wi-fi Modem

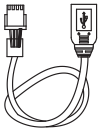
Wi-fi modem enables remote system operation from smartphone. Available functions include selection of on/off, operation mode, DHW heating, temperature setup and weekly scheduling etc. For detailed instructions, refer to the manual included in the accessories.

How to wire Wi-fi Modem

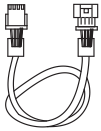
[Parts of Wi-fi modem]



Wi-fi modem body



USB Cable



Extension Cable

※ Extension cable for Wi-Fi Modem : PWYREW000 (Sold Separately)

Follow below procedures step 1 ~ step 5.

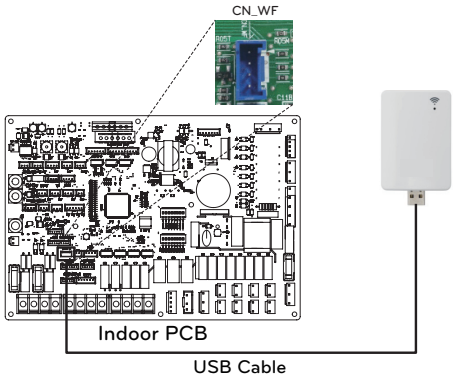
Step 1. Check if the power of the unit is turned off.

Step 2. Disassemble front panels and distinguish control box(Indoor) of the unit.

Step 3. Connect the USB cable to the indoor unit PCB (CN_WF ; Blue) until it clicks into place.

Step 4. Connect the Wi-Fi modem to the USB cable fully.

Step 5. Refer to the image below to install the Wi-Fi modem in the marked position.



Energy State

This product provides energy states that enable customers to use as much as possible of their own renewable energy. It can shift setpoints depending on input signal from Energy Storage System (ESS) or from any other third-party device using Modbus RTU or Digital 230V inputs.

Available Energy States

There are 8 energy states available. 4 fixed and 4 customizable - each with the possibility to enhance self-consumption of renewable energy.

Energy state	Command	Battery State of charge	Operation (standard setting)					
			Heating		Cooling		Domestic Hot Water	
			Setting	Range	Setting	Range	Setting	Range
1	Operation Off (Utility lock)	Low	Forced internal operation off	Fixed	Forced internal operation off	Fixed	Forced internal operation off	Fixed
2	Normal Operation	Normal	Maintain operation status	Fixed	Maintain operation status	Fixed	Maintain operation status	Fixed
3	Operation On Recommend	High	Increase 2 °C from target temperature	Fixed	Maintain operation Status	Fixed	Increase 5 °C from target temperature	Fixed
4	Operation On Recommend	Very High	Maintain operation status	Fixed	Maintain operation status	Fixed	DHW Target 80 °C	Fixed
5	Operation On Commend	Very High	Increase from target temperature	0/+30 (Default : +5)	Decrease from target temperature	0/-30 (Default : -5)	Increase from target temperature	0/+50 (Default : +30)
6	Operation On Recommend	High	Increase from target temperature	0/+30 (Default : +2)	Decrease from target temperature	0/-30 (Default : -2)	Increase from target temperature	0/+50 (Default : +10)
7	Operation Save	Low	Decrease from target temperature	0/-30 (Default : -2)	Increase from target temperature	0/+30 (Default : +2)	Decrease from Target Temperature	0/-50 (Default : 0)
8	Operation Super Save	Very Low	Decrease from target temperature	0/-30 (Default : -5)	Increase from target temperature	0/+30 (Default : +5)	Decrease from Target Temperature	0/-50 (Default : 0)

Digital Input for energy saving (ESS, Smart Grid)

This product provides two digital inputs (ES1 / ES2) that can be used to switch between energy states when not using Modbus RTU (CN-COM).

Available Energy States

There are 8 energy states available in total. Four different states can be triggered using the 230V-inputs – by default Energy states 1-4.

With the digital input assignment in the menu 'Energy state/Digital input assignment of the control panel, different Energy states can be selected for Signals 0:1 and 1:1.

0:0 is always linked with ES2 (Normal operation) and 1:0 is always linked with ES1 (Operation off/Utility lock).

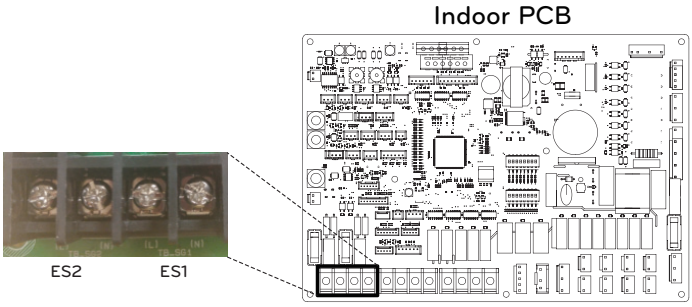
How to set Digital input signal

Follow below procedures step 1 ~ step 3.

Step 1. Check if the power of the unit is turned off.

Step 2. Disassemble front panels and distinguish terminal block in Indoor PCB.

Step 3. Connect signal cable to terminal block in PCB (ES2, ES1) fully as shown below.



Energy state depending on input signal (ES1 / ES2)

Input Signal		Output state	
ES1	ES2	Default	Range
0	0	ES2	fixed
1	0	ES1	
0	1	ES3	ES3-ES8
1	1	ES4	

2Way Valve

2way valve is required to control water flow while cooling operation. Role of 2way valve is to cut off water flow into under floor loop in cooling mode when fan coil unit is equipped for cooling operation.

General Information

THERMA V. supports following 2way valve.

Type	Power	Operating Mode	Supported
NO 2-wire (1)	230 V AC	Energize : Valve Closing	Yes
		De-Energize : Valve Opening	
NC 2-wire (2)	230 V AC	Energize : Valve Closing	Yes
		De-Energize : Valve Opening	

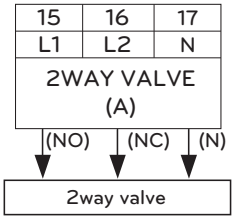
(1) : Normal Open type. When electric power is NOT supplied, the valve is open. (When electric power is supplied, the valve is closed.)
(2) : Normal Closed type. When electric power is NOT supplied, the valve is closed. (When electric power is supplied, the valve is open.)

How to Wire 2Way Valve

Follow below procedures Step 1 ~ Step 2.

Step 1. Uncover front cover of the unit.

Step 2. Find terminal block and connect wire as below.



(NO) : Live signal (for Normal Open type) from PCB to 2way valve.
(NC) : Live signal (for Normal Closed type) from PCB to 2way valve.
(N) : Neutral signal from PCB to 2way valve.

⚠ CAUTION

Dew Condensation
- Wrong wiring can yield dew condensation on the floor. If radiator is connected at the under floor water loop, dew condensation can be occurred on the surface of the radiator.

⚠ WARNING

Wiring
- Normal Open type should be connected to wire (NO) and wire (N) for valve opening in cooling mode.
- Normal closed type should be connected to wire (NC) and wire (N) for valve closing in cooling mode.

Final Check

- Flow direction :
  - Water should not flow into under floor loop in cooling mode.
  - To verify the flow direction, check temperature at the water inlet of the under floor loop.
  - If correctly wired, this temperatures should not be reached below 16 °C in cooling mode.

3Way Valve(A)

3Way Valve(A) is required to operate DHW water tank. Role of 3way valve is flow switching between under floor heating loop and water tank heating loop.
Plus, it is required to operate 3rd party boiler.

General Information

THERMA V supports following 3way valve.

Type	Power	Operating Mode	Supported
SPDT [1] 3-wire	220-240 V~	Selecting Flow A[2] between Flow A and Flow B	Yes
		Selecting Flow B[3] between Flow A and Flow B	Yes

1) : SPDT = Single Pole Double Throw. Three wires consist of Live1 (for selecting Flow A), Live 2 (for selecting Flow B), and Neutral (for common).

2) : Flow A means 'water flow from the unit to under floor water circuit.'

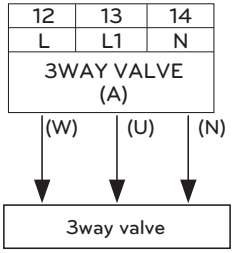
3) : Flow B means 'water flow from the unit to DHW water tank.'

How to wire 3way valve(A)

Follow below procedures Step 1 ~ Step 2.

Step 1. Uncover front cover of the unit.

Step 2. Find terminal block and connect wire as below.



(W) : Live signal (Water tank heating) from PCB to 3way valve
(U) : Live signal (Under floor heating) from PCB to 3way valve
(N) : Neutral signal from PCB to 3way valve

⚠ WARNING

- 3way valve should select water tank loop when electric power is supplied to wire (W) and wire (N).
- 3way valve should select under floor loop when electric power is supplied to wire (U) and wire (N).

Final check

No.	Check point	Description
1	Connection of Water Inlet/Outlet	- Check if the shut-off valves should be assembled with Water inlet and outlet pipe of the unit - Check the location of the water inlet/outlet water pipe
2	Hydraulic pressure	- Check the pressure of supplying water by using pressure gauge inside the unit - Pressure of Supplying water should be Under 3.0 bar approximately
3	Water pump capacity	- To secure enough water flow rate, do not set water pump capacity as Minimum. - It can lead unexpected flow rate error CH14. (Refer to 'Water Piping and Water Circuit Connection')
4	Transmission line and power source wiring	- Check if Transmission line and power source wiring are separated from each other. - If it is not, electronic noise may occur from the power source.
5	The power cord specifications	- Check the power cord specifications (Refer to 'Connecting Cables')
6	3Way Valve	- Water should flow from Water outlet of the unit to sanitary tank Water inlet when sanitary tank heating is selected. - To verify the flow direction, Make sure that the water outlet temperature of the unit and water inlet temperature of sanitary Water tank are similar
7	2Way Valve	- Water should not flow into under floor loop in cooling mode. - To verify the flow direction, check temperature at the water inlet of the under floor loop. - If correctly wired, this temperatures should not be reached below 16 °C in cooling mode.
8	Air Vent	- Air-vent must be located highest level of Water pipe system - It should be installed at the point which is easy to service. - It takes some times to remove air in the water system if air purge is not performed sufficiently it may occur CH14 error. (Refer to 'Water Charging')

CONFIGURATION

As THERMA V. is designed to satisfy various installation environment, it is important to set up system correctly. If not configured correctly, improper operation or degrade of performance can be expected.

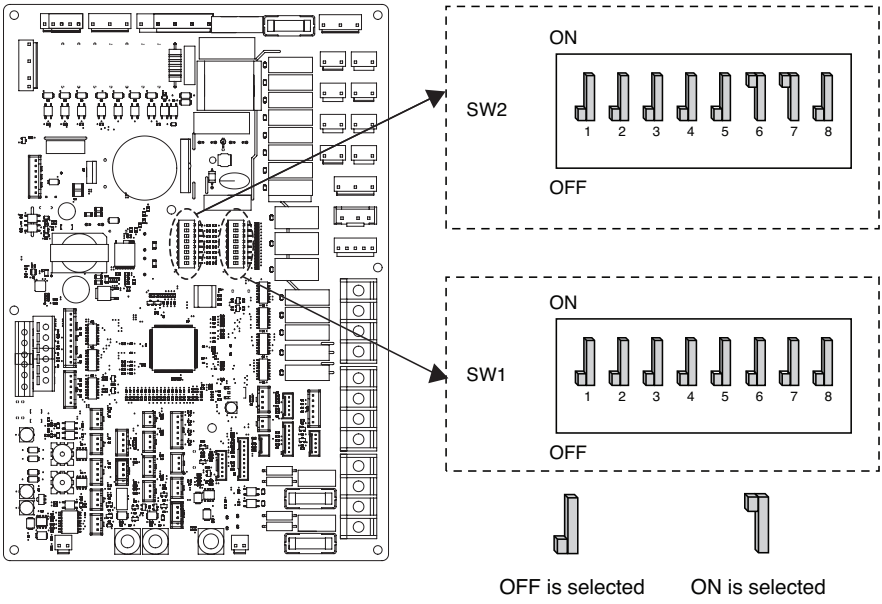
DIP Switch Setting

⚠ CAUTION

Turn off electric power supply before setting DIP switch

- Whenever adjusting DIP switch, turn off electric power supply to avoid electric shock.

Indoor PCB



DIP Switch Information

Option Switch 2

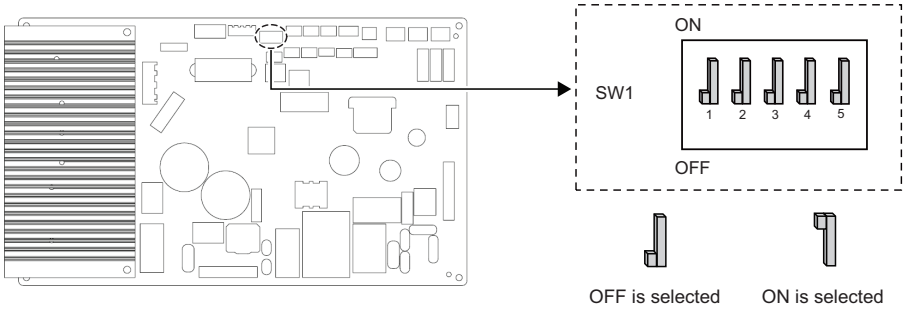
Description	Setting		Default
Accessory installation information	 2 3	Heat pump is installed (Heating(Cooling) circuit only)	 2  3
	 2 3	Heat pump + DHW tank is installed	
	 2 3	Heat pump + DHW tank + Solar thermal system is installed	
Cycle	 4	Heating Only	 4
	 4	Heating & Cooling	
Room Air Sensor	 5	Room Air Sensor is not installed	 5
	 5	Room Air Sensor is installed	
Selecting Backup heater capacity	 6 7	Electric heater is not used	 6  7
	 6 7	Half capacity is used	
	 6 7	Reserved	
	 6 7	Full capacity is used	
Thermostat installation information	 8	Thermostat is NOT installed	 8
	 8	Thermostat is installed	

Option Switch 1

Description	Setting		Default
MODBUS Communication Type	1	As Master (LG extension modules)	1
	1	As Slave (3rd party controller)	
MODBUS Function	2	Unified Open Protocol	2
Antifreeze Agent	8	Antifreeze agent is not used	8
	8	Antifreeze agent is used *	

* Possibility to allow colder water temperature by setting.
  Bridge at CN_ANTI_SW must be dis-connected to enable setting.

Outdoor PCB



DIP Switch Information

Description	Setting		Default
Low Noise Mode	2 	Always Mode - Maintain low noise mode for target temperature	2 
	2 	ON/OFF Partial mode - Escape low noise mode for target temperature	
Peak Control	3  4 	Max Mode	3  4 
	3  4 	Peak Control Step 1 - To limit maximum current (Power saving)	
	3  4 	Peak Control Step 2 - To limit maximum current (Power saving)	

※ Only DIP-switch no. 2 and no.3 has a function. Others have no function.

※ When setting the limited low noise mode, Mode can be exited to secure capacity after operating for a certain time.

NOTE

* Input current value can be limited by DIP Switch operation.

Model Name			Peak Control Mode Running Current (A)	
Chassis	Phase (Ø)	Capacity (kW)	1 Step	2 Step
U24A	1	4	10	
		6	13	

NOTE

Emergency Operation

• Definition of terms

- Trouble : a problem which can stop system operation, and can be resumed temporally under limited operation without certificated professional's assist.
- Error : problem which can stop system operation, and can be resumed ONLY after certificated professional's check.
- Emergency mode : temporary heating operation while system met Trouble.

• Objective of introducing 'Trouble'

- Not like air conditioning product, Air-to-Water heat pump is generally operation in whole winter season without any system stopping.
- If system found some problem, which is not critical to system operating for yielding heating energy, the system can temporarily continue in emergency mode operation with end user's decision.

• Classified Trouble

- Trouble is classified two levels according to the seriousness of the problem : Slight Trouble and Heavy trouble
- Slight Trouble : a problem is found inside the unit. In most case, this trouble is concerned with sensor problems. The outdoor unit is operating under emergency mode operation condition which is configured by DIP switch No. 4 of the unit PCB.
- Heavy trouble : a problem is found inside the outdoor unit. As the outdoor unit has problem, the emergency mode operation is performed by electric heater located in the unit.
- Option Trouble : a problem is found for option operation such as water tank heating. In this trouble, the troubled option is assumed as if it is not installed at the system.

• When the AWHP has any trouble,

(1) If there is not a function to judge possibility of operation :

Once a trouble occurs mainly in indoor unit, AWHP stops. On the other hand, remote controller allows the product to activate On/ Off operation. (On : emergency operation)

- Slight / Heavy trouble : Heating Operable only
- Critical trouble : Full stop
- Treatment priority : Critical>Heavy>Slight

(2) If there is a function to judge possibility of operation :

Depending on the status of slight / heavy / critical trouble, pop-up phrase is guided separately on display.

- Slight trouble : Heating/Cooling Operable
- Heavy trouble : Heating Operable only
- Critical trouble : Service center request

AWHP operates when user pressed OK button on pop-up window.

NOTE

• Duplicated trouble : Option trouble with slight or heavy trouble

- If option trouble is occurred with slight (or heavy) trouble at the same time, the system puts higher priority to slight (or heavy) trouble and operates as if slight (or heavy) trouble is occurred.
- Therefore, sometimes DHW heating can be impossible in emergency operation mode. When DHW is not warming up while emergency operation, please check if DHW sensor and related wiring are all Ok.

• Emergency operation is not automatically restarted after main electricity power is reset.

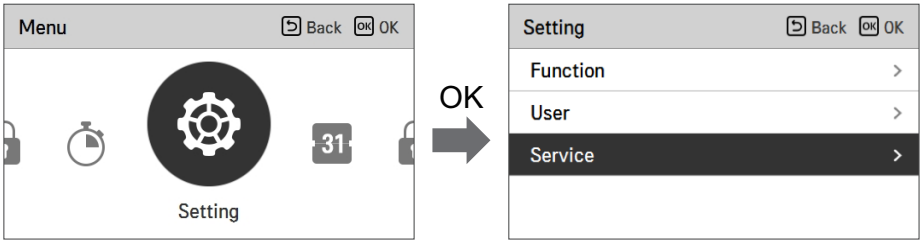
- In normal condition, the product operating information is restored and automatically restarted after main electricity power is reset.
- But in emergency operation, automatic re-start is prohibited to protect the product.
- Therefore, user must restart the product after power reset when emergency operation has been running.

SERVICE SETTING

How to enter service setting

To enter the menu displayed at the bottom, you need to enter the service setting menu as follows.

- In the menu screen, press [<,>(left/right)] button to select the setting category, and press [OK] button to move to the setting list.
- In the setting list, select the service setting category, and press [OK] button to move to the service setting list.



Service setting

- You can set the product service functions.
- Some functions may not be displayed/operated in some product types.

Menu	Description
Service contact	Check and input the service center phone number that you can call when there is service issue.
Model information	View product and capacity information
RMC Version Information	Check the remote controller model name and software version.
Open Source License	View the remote controller's open source license.

Service contact

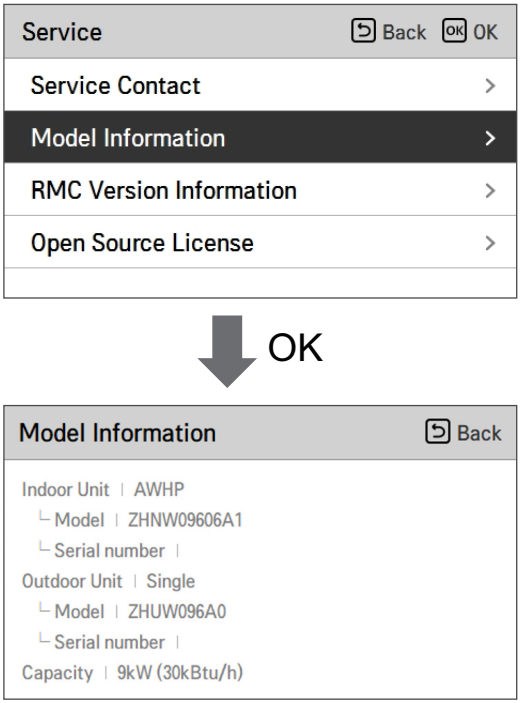
Check and input the service center phone number that you can call when there is service issue.

- In the service setting list, select the service contact point and press [OK] button to move to the detail screen.
- While “edit” button is selected, press [OK] button to move to the edit screen, change it, and press [OK] button to change the service contact point.

Model information

Check product and capacity information to which the remote controller is connected.

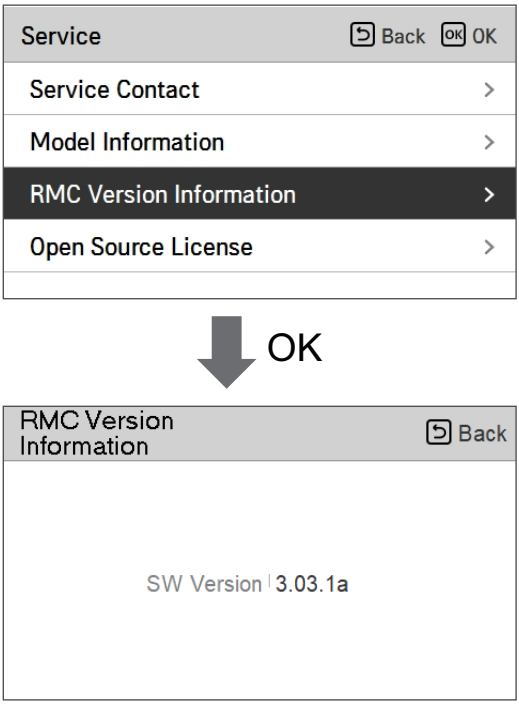
- In the service setting list, select model information category, and press [OK] button to move to the detail screen.
- The Model information
  - Depending on the model you own, the model name and serial number may not be displayed.
  - The displayed model name is the factory model name.
- The unit capacity
  - 1 kWh = 1 kBtu * 0.29307
    kWh is the result calculated based on Btu, There may be a small difference between calculated and actual capacity.
    Ex) If the unit capacity is 18 kBtu, it is displayed as 5 kWh.



RMC version Information

View the remote controller software version.

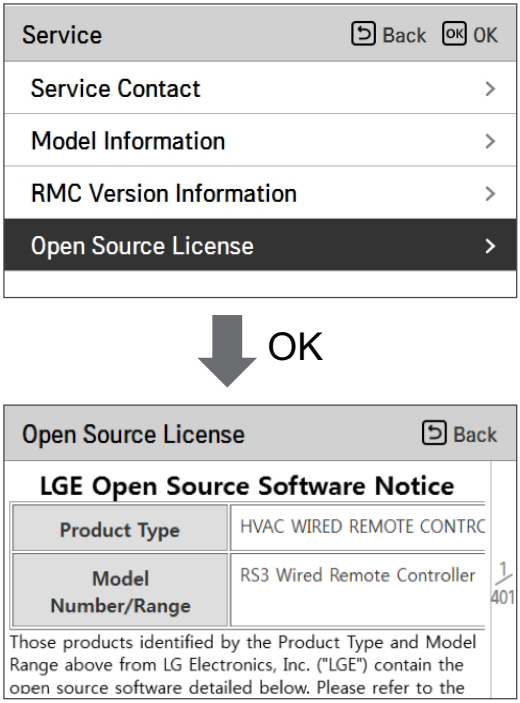
- In the service setting list, select the RMC version information and press [OK] button to move to the detail screen



Open source license

View the remote controller's open source license.

- In the service setting list, select the open source license category, and press [OK] button to move to the detail screen.



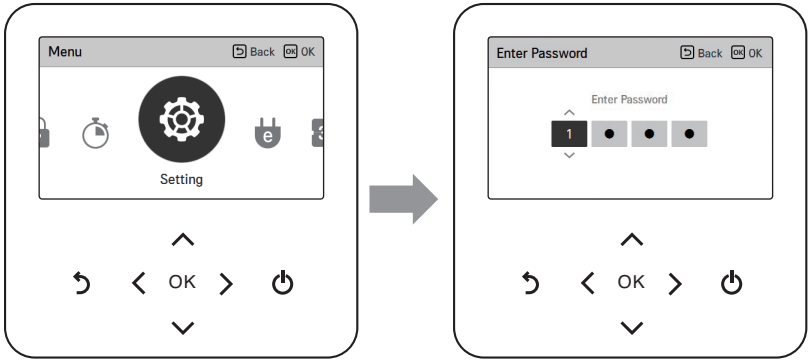
INSTALLER SETTING

How to enter installer setting

CAUTION

The installer setting mode is the mode to set the remote controller's detail function. If the installer setting mode is incorrectly set, it may cause product failure, user's injury, or property damage. It must be set by the installation specialist with the installation license, and if it is installed or changed without installation license, all problems caused will be the responsibility of the installer, and may void the LG warranty.

- In the menu screen, press [<,>(left/right)] button to select the setting category, and press [∧(up)] button for 3 seconds to enter the password input screen for the installer setting.
- Input the password and press [OK] button to move to the installer setting list.



※ Installer setting password

Main screen ⟶ menu ⟶ setting ⟶ service ⟶ RMC version information ⟶ SW Version

Example) SW version : 1.00.1 a

In the above case, the password is 1001.

NOTE

Some categories of the installer setting menu may not be available depending on the product function or the menu name may be different.

Installer Setting

- You can set the product user functions.
- Some functions may not be displayed/operated in some product types.

Segmentation	Functions	Description
Configuration	Select Temperature Sensor	Selection for setting temperature as air temperature or leaving water temperature or air + leaving water temperature
	Use Heating Tank Heater	Set up to control booster heater
	Mixing Circuit	This function is to use mixing circuit function. Set enable/disable mixing circuit function and valve closing time and hysteresis.
	Use External Pump	Set up to control an external water pump
	RMC master/slave	Function to use 2 remote control environment
	LG Therma V Configuration	Function to save the environment settings of the product for use in LG Therma V Configurator through SD Card.
General settings	Forced operation	Water pump off After 20 consecutive hours, disable / enable the logic that drives the water pump by itself
	Pump Prerun/Overrun	Set to reach the optimum flow rate by circulating the heating water with the water pump before heat exchange. After the operation stop, additional water pump is activated to circulate the heating water.
	Water Flow Control	Set water pump to control the water flow
	Energy Monitoring	Set up to use energy monitoring fuction of unit
	Password Reset	It is the function to initialize (0000) the password when you forgot the password set in the remote controller.
Room Heating	Heating temp. setting	At the water control in heating mode, the control reference water temperature position setting
	Air heating set temp.	Adjusting range of 'Setting Air Temperature' in heating mode
	Water heating set temp.	Adjusting range of 'Setting Heating Flow Temperature' in heating mode
	Hysteresis Heating Water	Heating Water Outlet Temperature Hysteresis range setting
	Hysteresis Room Air (Heating)	Heating air temperature Hysteresis range setting
	Pump setting in heating	Set water pump on/off interval option during thermo off condition in heating mode
	Heater on temperature	Setting outdoor air temperature where half capacity of backup heater starts operation.
	Screed drying	This function controls floor heating to a specific temperature for a certain period of time to cure floor cement

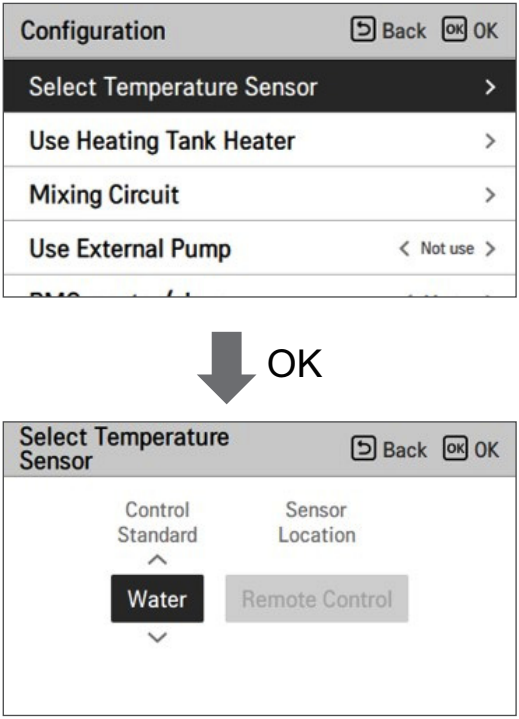
Segmentation	Functions	Description
Room Cooling	Cooling temp. setting	At the water control in cooling mode, the control reference water temperature position setting
	Air cooling set temp.	Adjusting range of 'Setting Air Temperature' in cooling mode
	Water cooling set temp.	Adjusting range of 'Setting Leaving Water Temperature' in cooling mode
	Water supply off temp. during cooling	Determine the leaving water temperature which blocks the flow into underfloor coil in cooling mode. This function is used for preventing condensation on the floor in cooling mode
	Hysteresis Cooling Water	Cooling Water Outlet Temperature Hysteresis range setting
	Hysteresis Room Air (Cooling)	Cooling air temperature Hysteresis range setting
	Pump setting in cooling	Set water pump on/off interval option during thermo off condition in cooling mode
Auto mode	Seasonal auto temp	Set the operating temperature in Seasonal Auto mode
Domestic hot water	DHW set temp.	Setting DHW set temperature
	Tank disinfection setting 1	Setting start/maintain time for disinfection
	Tank disinfection setting 2	Setting disinfection temperature
	Tank setting 1	Setting minimum and maximum temperature using heat pump cycle for DHW heating
	Tank setting 2	Setting temperature hysteresis and heating priority (DHW heating or floor heating)
	Heater priority	Determine usage of backup heater and booster heater
	DHW time setting	Determine follow time duration : operation time of domestic hot water tank heating, stop time of domestic hot water tank heating, and delay time of DHW tank heater operating
	Recirculation time	Whether to use the recirculation function and set the water pump on/off interval option
Solar thermal	Solar Thermal System	Function to set operation reference value in Solar Thermal System.

Segmentation	Functions	Description
Service	Pump test run	Water pump test run
	Frost Protection Temp.	This function is to apply an offset to the freezing temperature of the freeze protection logic when using antifreeze mode
	BUH for DHW in emerg.	This function selects whether or not to heat DHW with Backup Heater when emergency operation is entered.
Connectivity	Dry Contact Mode	Dry contact function is the function that can be used only when the dry contact devices is separately purchased and installed.
	Central Control Address	When connecting the central control, set the central control address of the unit.
	CN_CC	It is the function to set whether to install (use) Dry Contact. (It is not a function for Dry Contact installation, but it is a function to set the usage of the unit's CN_CC port.)
	CN_EXT	Function to set external input and output control according to DI / DO set by customer using dry contact port of indoor unit. Determine the use of the contact port (CN_EXT) mounted on the indoor unit PCB
	3rd Party Boiler	Configuration to control 3rd party boiler
	Meter Interface	When installing the meter interface to measure energy / calorie in the product, set unit spec for each port
	Energy state	Select whether to use or not use the SG Mode function of the product, set the operation option value in SG1 step.
	Thermostat control type	Setting Thermostat control type
	Modbus Address	It is function to set the address of the Modbus device that is externally linked to the product. Modbus address setting function is available from indoor unit.
Info	Pump operation time	Display water pump's operation time
	IDU operation time	Display Indoor Unit's operation time
	Current Flow Rate	Function to check the current flow rate.
	Data logging	Display error and operation history of connected unit

Select Temperature Sensor

The product can be operated according to air temperature or water temperature. The selection for setting temperature as air temperature or water temperature is determined.

- In the installer setting list, Select Temperature Sensor category, and press [OK] button to move to the detail screen.



Value	Default	Range
Control Standard	Water	Water / Air / Air + Water
Sensor Location	Remote Control	Remote Control / Indoor Unit

* When Water is selected, Sensor Location is disabled.

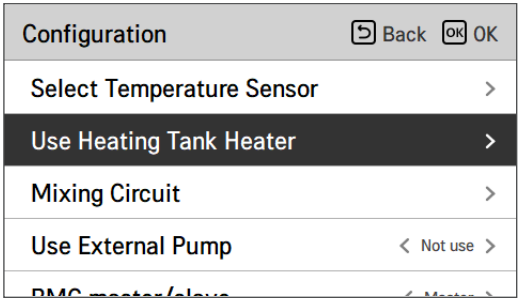
NOTE

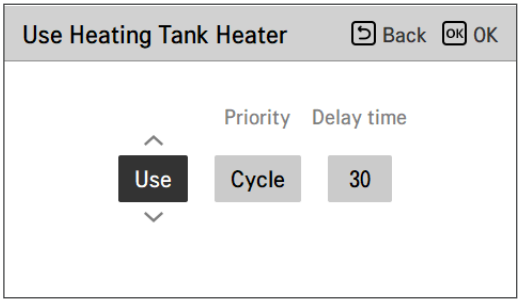
- Set DIP switch No. 5 of option switch 2 to 'ON' in order to use remote temperature sensor.
- When the sensor location is set to Remote Control, the RS3 controller must be placed inside of suitable Reference room.

Use Heating Tank Heater

This is a function to change the set value for the operation of the hot water tank heater, such as heating tank heater use /not use and heater delay time.

- In the installer setting list, Select Configuration category, and press [OK] button to move to the detail screen.

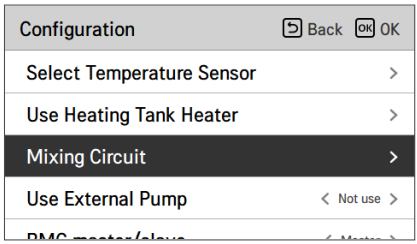


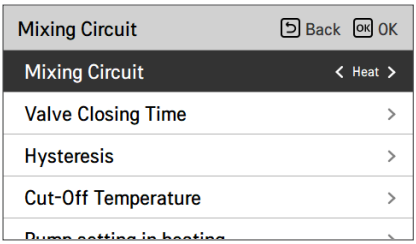


Value	Default	Range
-	Use	Use / Not Use / Use disinfect
Priority	Cycle	Cycle / Heater/Cycle
Delay time	30 min	10 / 20 / 30 / 40 / 50 / 60 / 90 / 120 / 1440 min

Mixing Circuit

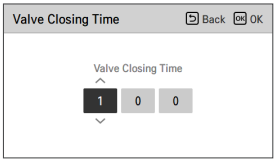
Function to set whether or not to use a installed mixing circuit function using mixing kit.

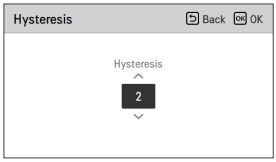


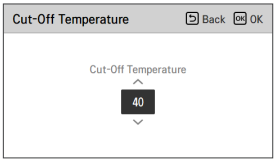


Value	Default
Not Use / Heat / Cool	Not Use

You can set valve closing time[s] and hysteresis temperature[°C] on screen by yourself.
Setting the cut-off temperature protects the water from flowing over the cut-off temperature in the mixing circuit during heating operation.



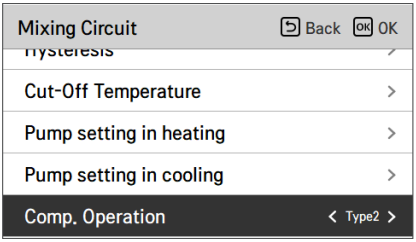




Value	Default	Range
Valve Closing Time	240 s	60 ~ 999 s
Hysteresis	2 °C	1 ~ 3 °C
Cut-Off Temperature	40 °C	20 ~ 65 °C

You can set the operation of the outdoor unit when only the mixing circuit is operating and the direct circuit is not operating.

Type1	Type2(Default)
Outdoor Operation	Outdoor Not Operation



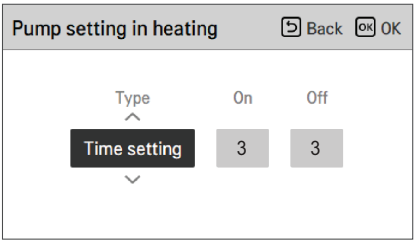
Value	Default
Type 1 / Type 2	Type 2

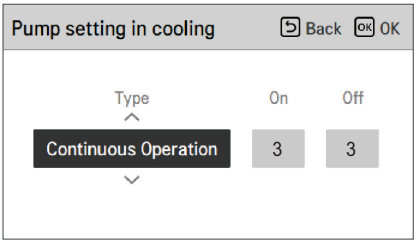
CAUTION

Set Type 1 only at the installation site with a small load or no buffer tank.

When setting Type 1 in a site with a large load or a site with a buffer tank, overheating may occur in the direct circuit.

Installer setting function to set water mixing pump operation / delay time option in heating/cooling mode





Value	Default	Range
Type	Time Setting	Time Setting / Continuous Operation
On	3 min	1 ~ 60 min
Off	3 min	1 ~ 60 min

* When Continuous Operation is selected, On, Off is disabled.

Activating this function, It allows 2 circuits (Circuit 1, Circuit 2) temperature to be controlled, separately.

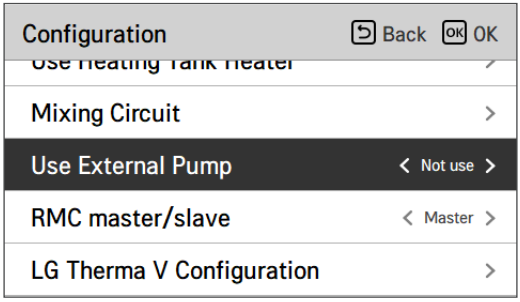
NOTE

When using the Mixing Circuit function, the external pump setting must be changed to 'Circuit 1'.

Use External Pump

This function can be set to control the external water pump.

- In the installer setting list, select Use External Pump category, and press [OK] button to move to the detail screen.
- Heating/Cooling
  You can use this feature when you have installed a 3 Way valve to switch the water flow between the underfloor and the water tank. The external pump operates only in the direction of water flow in the underfloor.
- Circuit1
  This function controls the external pump when operating the mixing circuit.
  The external pump should be controlled according to Th/on and Th/off in Circuit1(Direct circuit).
  Therefore, when using the mixing circuit, be sure to set the external pump to 'Circuit1'.

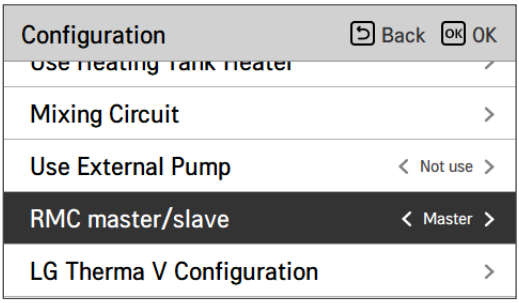


Value			
Not use (Default)	Use	Heat & Cool	Circuit1

RMC master/slave

This function can be select Master/Slave on remote controller to use 2 Remote Control environment

- In the Installer setting list, and select RMC master/slave setting category, and press [<,>(left/right)] button to following setting values.

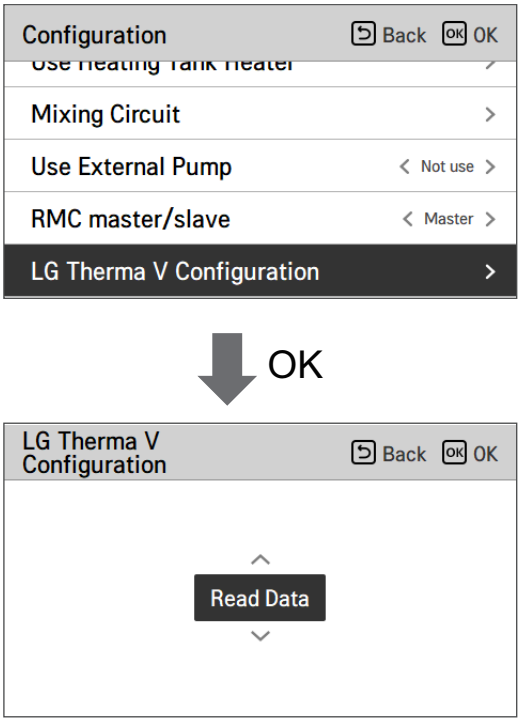


Value	
Master (Default)	Slave

LG Therma V Configuration

This function can be set to save the environment settings of the product for use in LG Therma V Configurator through SD Card.

- In the Installer setting list, and select LG Therma V Configuration setting category, and press [OK] button to move to the detail screen.



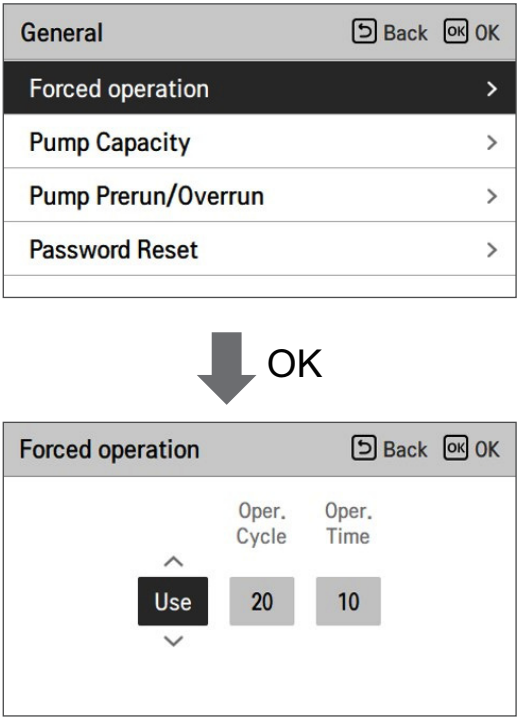
Value	
Read Data (Default)	Save Data

NOTE

When saving the environment setting of the product in the SD card, be sure to save the file name as 'RS3_AWHP_DATA'.

Forced operation

- If the product is not used for a long time, the pump will be forced to operate to prevent pump failure and PHEX freezing
- Water pump off After 20 consecutive hours, disable / enable the logic that drives the water pump by itself
- In the installer setting list, select Forced operation category, and press [OK] button to move to the detail screen

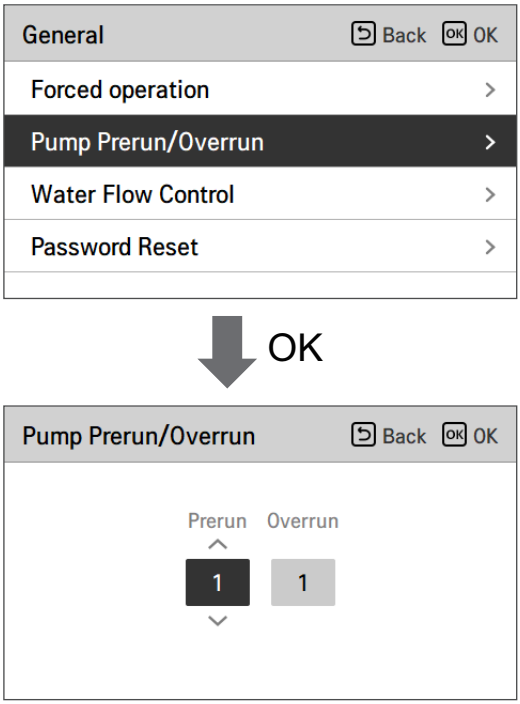


Value	Default	Range
-	Use	Use / Not Use
Oper. Cycle	20 hours	20 ~ 180 hours
Oper. Time	10 min	1 ~ 60 min

Pump Prerun/Overrun

Pump Prerun operates to ensure sufficient flow before the compressor is operated. This is a function that allows heat exchange to work smoothly.

Pump Overrun removes latent heat from the PHEX by circulating the water flow when the comp is stopped



Value	Default	Range
Prerun	1 min	1~10 min
Overrun	1 min	1~10 min

Water Flow Control

This function controls the water flow by controlling the water pump. Select the way to control the water pump and set the target value

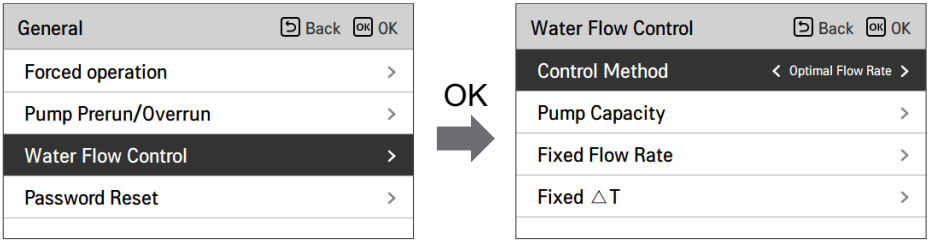
- In the installer setting list, select Configuration category, and press [OK] button to move to the detail screen.
- Optimal Flow Rate

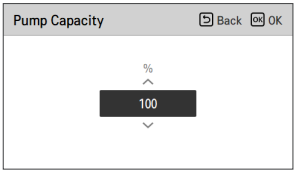
  The water pump is automatically controlled at the optimum flow rate required according to the desired temperature of the Main screen.
- Pump Capacity

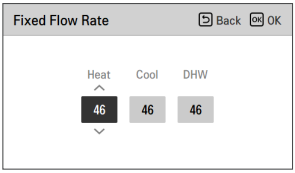
  It operates with the capacity set for the water pump.
- Fixed Flow Rate

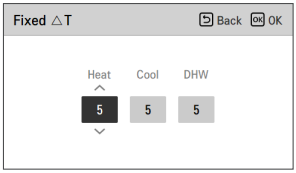
  The water pump is automatically controlled to maintain the set flow rate.
- Fixed ΔT

  Set the target ΔT (*ΔT = temperature difference between inlet and outlet water temperature) The water pump is automatically controlled to maintain the set ΔT.







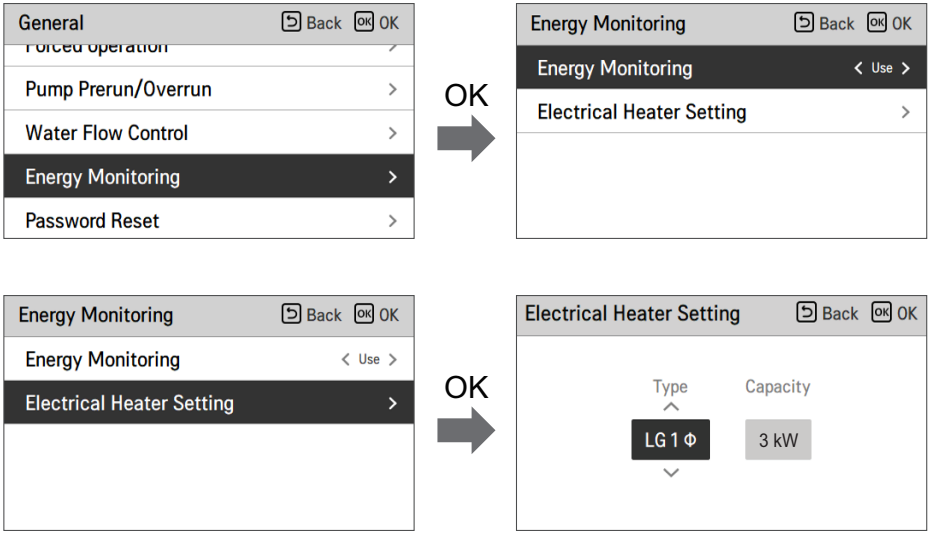


Flow Control Method			
Optimal Flow Rate (Default)	Pump Capacity	Fixed Flow Rate	Fixed ΔT

Energy Monitoring

This function can be set to use energy monitoring function of unit.

• Change setting values using [<,>(left/right)] button.

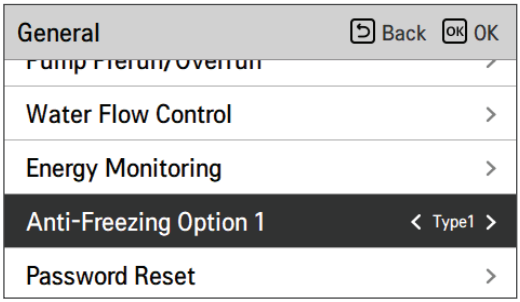


Value		Default	Range
Energy Monitoring		Use	Use/Not Use
Electric Heater Setting	Type	LG 1Ø	LG 1Ø / LG 3Ø / EXTERNAL
	Heater Capacity	3 kW	1 kW ~ 10 kW

Anti-Freezing Option 1

This function is to select whether to use Type1 or Type2 to prevent freezing when the remote control is turned off.

• Change setting values using [<,>(left/right)] button.



Value	
Type1(Default)	Type2

CAUTION

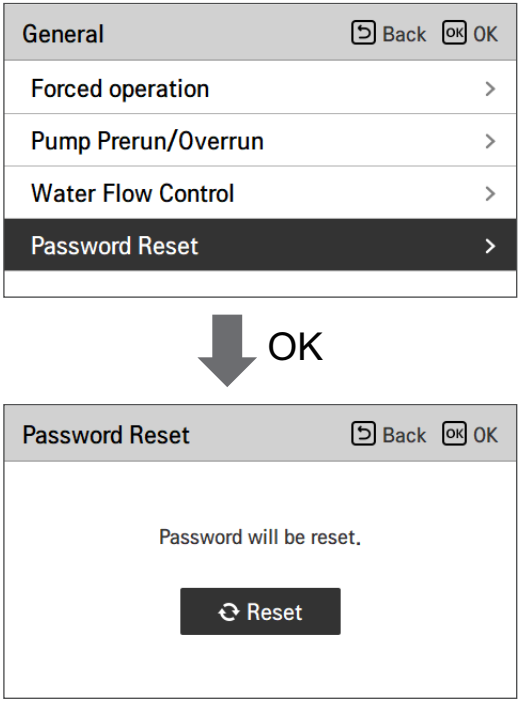
If the function is set to Type2, there is a risk of freezing.

Function	Detection	Case	Operation
Type1	Type2 + Inlet Water Temp.	Air Temp. < Certain Level and Inlet Water Temp. < Certain Level	Pump always ON
		Air Temp. < Certain Level and Inlet Water Temp. > Certain Level	Pump intermittently On
		Air Temp. > Certain Level and Inlet Water Temp. > Certain Level	Pump always OFF
Type2	Air Temp.	Air Temp. < Certain Level	Pump intermittently On
		Air Temp. > Certain Level	Pump always OFF

Password Reset

It is the function to initialize (0000) when you forgot the password set in the remote controller.

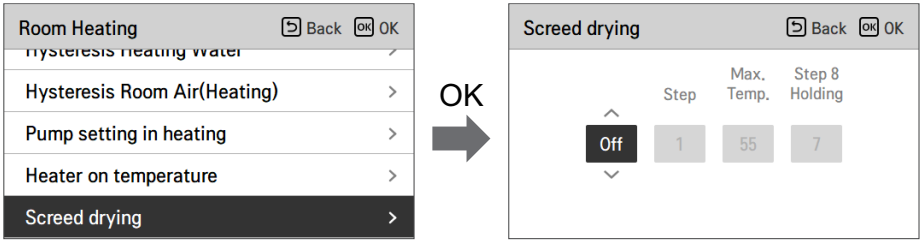
- In the installer setting list, select the password Reset setting category, and press [OK] button to move to the detail screen.
- When you press “Reset” button, a popup screen appears, and when you press “check” button, password initialization starts, and the user password is changed to 0000.



Screed drying

This function is a unique feature of AWHP that, when AWHP is installed in a new concrete structure, controls the specific temperature floor heating out temperature for a certain period of time to cure the floor cement.

- In the installer setting list, select Screed drying category, and press [OK] button to move to the detail screen.



How to display

Main Screen - Displays 'Screed drying' on the desired temperature display. The step in progress at the bottom of the display is displayed.

Setting value

- Start-up step: 1 ~ 11
- Maximum temperature : 35 °C ~ 55 °C (Default : 55 °C)
- Step 8 Holding time : 1 days ~ 30 days (Default : 7 days)

Function operation

- It is performed by the following procedure from the selected starting step.
- After all steps are completed, turn off the cement curing operation.

Value	Step										
	1	2	3	4	5	6	7	8	9	10	11
LWT	25 °C	Max. T	Off	25 °C	35 °C	45 °C	Max. T	Max. T	45 °C	35 °C	25 °C
Duration	72 h	96 h	72 h	24 h	24 h	24h	24 h	Holding time	72 h	72 h	72 h

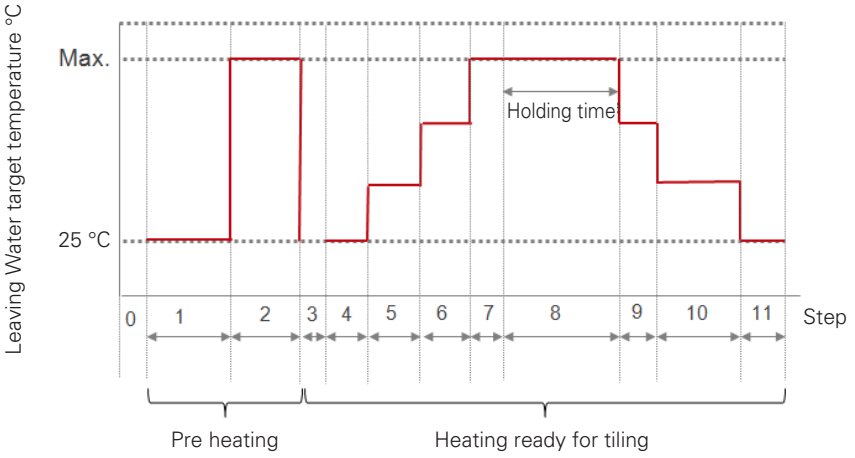
* LWT: Leaving Water Target Temp.

* Holding time range : 1 ~ 30 day(default: 7 day)

※ If the upper limit setting value of the heating LW temperature is 55 °C or lower, it is set to 55 °C forcibly.
If the lower limit setting value of the heating LW temperature is 25 °C or higher, it is set to 25 °C forcibly.

NOTE

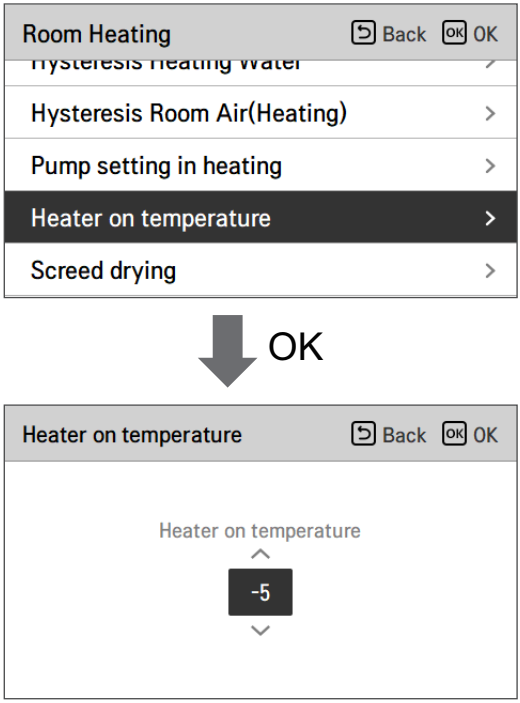
- During Screed drying operation, button input except for installer function and temperature display is restricted.
- When the power is applied again after a power outage during product operation, the product operation state before power failure is remembered and the product is automatically operated.
- Screed drying operation stops when an error occurs / When error is cleared, restart cement Screed drying. (However, if the wired remote control is reset to the error occurrence state, it is compensated in the unit of one day)
- Upon releasing after an error, Screed drying operation may take up to 1 minute of waiting time after boot up. (The Screed drying operation status is judged as 1 minute cycle.)
- During Screed drying operation, installer function Screed drying operation is selectable.
- During Screed drying operation, starting operation, low noise mode off, low noise time setting off, hot water off, solar heat off.
- During Screed drying operation, simple, sleep, on, off, weekly, holiday, heater does not execute reservation operation.



Heater on temperature

Depending on local climatic conditions, it is necessary to change the temperature condition in which backup heater turns on / off.

- In the installer setting list, Heater on temperature category, and press [OK] button to move to the detail screen.



Value	Default	Range
Heater on temperature	-5 °C	-25 ~ 18 °C

NOTE

Heater on temperature

- Using Half capacity of backup heater (For Split Indoor unit 5 Series)

  When DIP Switch No. 6 and 7 is set as 'ON-OFF' :

  Example : If Heater on temperature is set as '-1' and DIP switch No 6. and 7 is set as 'ON-OFF', then half capacity of electric heater will start operation when outdoor air temperature is below -1 °C and current leaving water temperature or room air temperature is much belower than target leaving water temperature or target room air temperature.

- Using Full capacity of backup heater

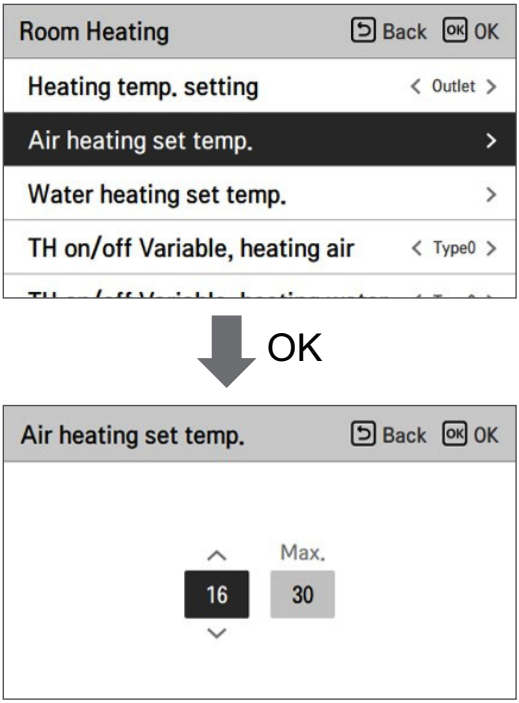
  When DIP Switch No. 6 and 7 is set as 'ON-ON' :

  Example : If Heater on temperature is set as '-1' and DIP switch No 6. and 7 is set as 'ON-ON', then full capacity of electric heater will start operation when outdoor air temperature is below -1 °C and current leaving water temperature or room air temperature is much belower than target leaving water temperature or target room air temperature.

Air heating set temp.

Determine heating setting temperature range when air temperature is selected as setting temperature

- In the installer setting list, select Air heating set temp. category, and press [OK] button to move to the detail screen.



Value	Default	Range
Min.	16 °C	16 ~ 22 °C
Max	30 °C	24 ~ 30 °C

NOTE

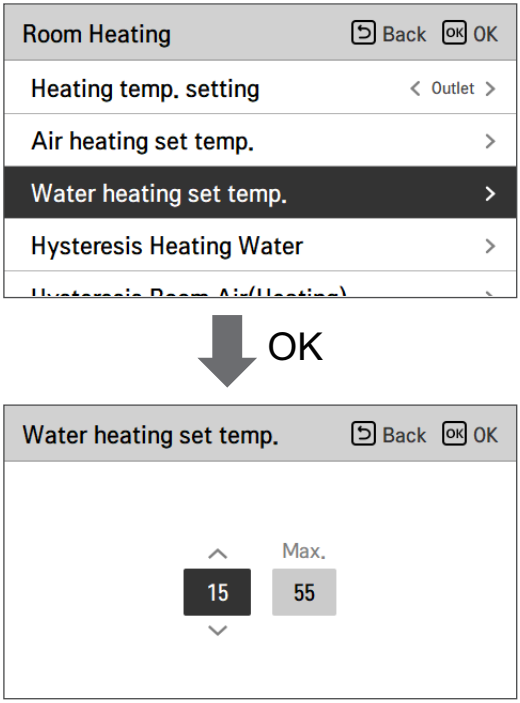
It is possible to control the unit based on room air temperature by using either remote air temperature sensor or wired remote controller (RS3).

- Remote room air sensor is an accessory (PQRSTA0) and sold separately.
- DIP switch setting (No. 5 of Indoor unit Option Switch 2) and installer setting(Select Temperature Sensor) should be set properly in order to use remote room air temperature sensor (PQRSTA0).

Water heating set temp.

Determine heating setting temperature range when water temperature is selected as setting temperature.

- In the installer setting list, select Water heating set temp. category, and press [OK] button to move to the detail screen.



Value	Default	Range
Min.	15 °C	15 ~ 34 °C
Max	55 °C	35 ~ 55 °C

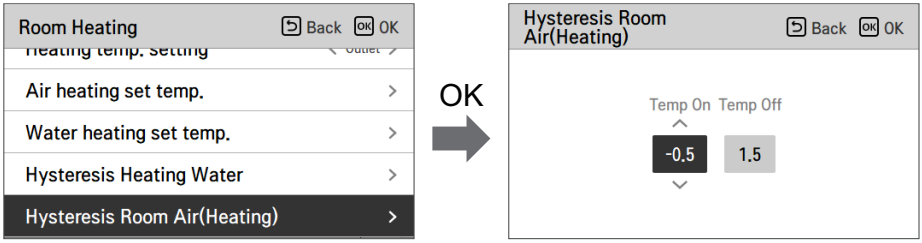
NOTE

- When the backup heater is not used, the minimum temperature of the water temperature can be set in the range of 34°C to 20°C. (Default : 20 °C)

Hysteresis Room Air(Heating)

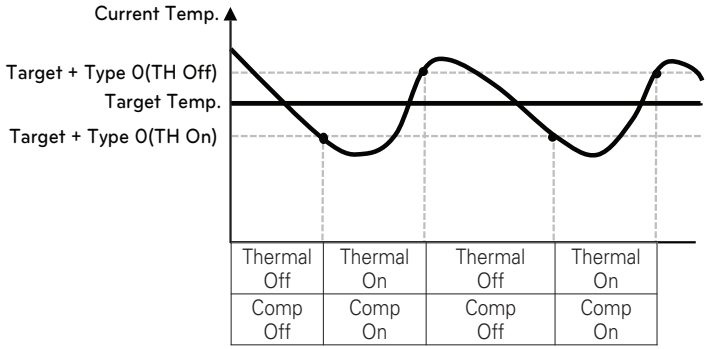
It is a function to adjust the heating air temperature Thermal On / Off temperature according to the field environment in order to offer optimized heating operation.

- In the Installer setting list, and select Hysteresis Room Air(Heating) category, and press [OK] button to move to the detail screen.



Value	Default	Range
Temp On	-0.5 °C	-3 ~ 0 °C
Temp Off	1.5 °C	0 ~ 4 °C

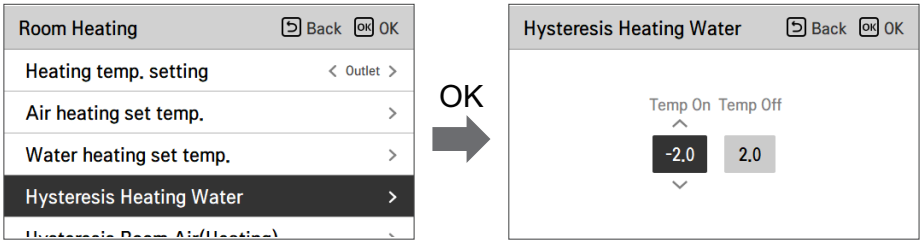
- Example : Type0 setting



Hysteresis Heating Water

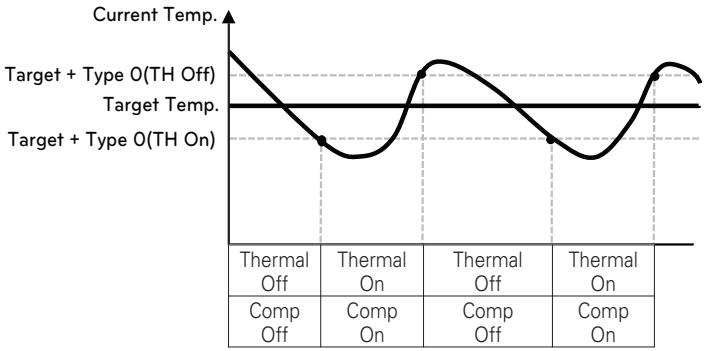
It is a function to adjust the heating water temperature Thermal On / Off temperature according to the field environment in order to offer optimized DHW heating operation.

- In the Installer setting list, and select Hysteresis Heating Water category, and press [OK] button to move to the detail screen.



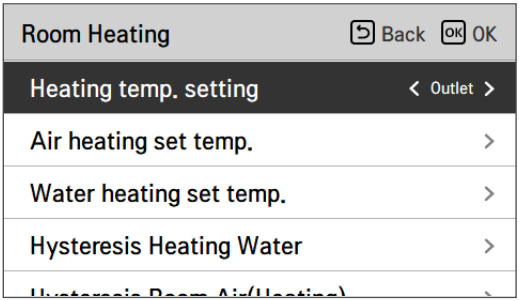
Value	Default	Range
Temp On	-2 °C	-9 ~ 0 °C
Temp Off	2 °C	0 ~ 4 °C

- Example : Type0 setting



Heating temp. setting

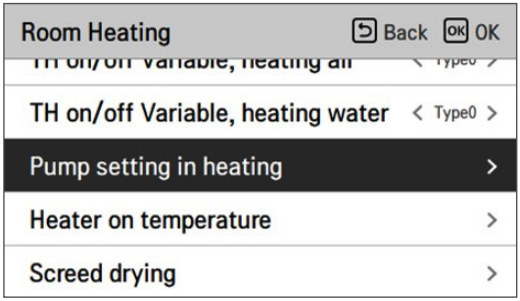
- At the water control in heating mode, the control reference water temperature position setting
  - If the air / leaving water temperature selection setting is set to leaving water temperature
- Change setting values using [<,>(left/right)] button
- The function is not available for some products.

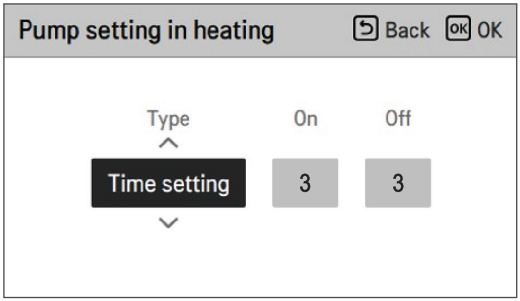


Value	
Outlet (Default)	Inlet

Pump setting in heating

- It is a function to help the water pump's mechanical life by putting the water pump's rest time
- Installer setting function to set water pump on/off interval option during thermo off condition in heating mode.
- In the installer setting list, select Pump setting in heating category, and press [OK] button to move to the detail screen.





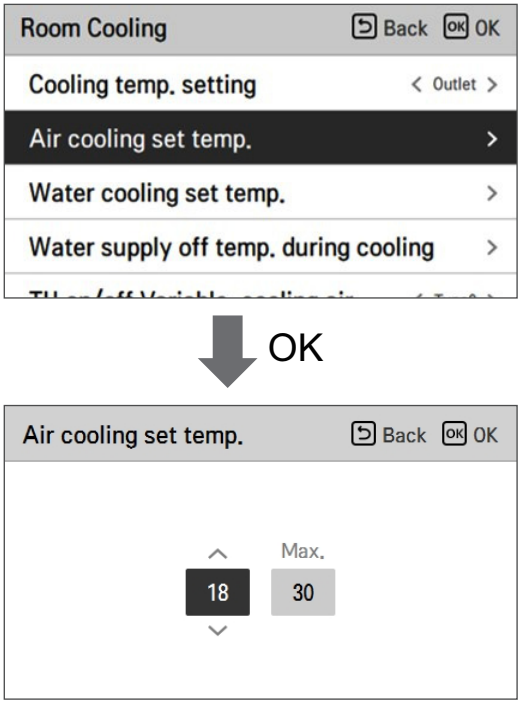
Value	Default	Range
Type	Time setting	Time setting / Continuous Operation
On	3 min	1 ~ 60 min
Off	3 min	1 ~ 60 min

* When Continuous Operation is selected, On, Off is disabled.

Air cooling set temp.

Determine cooling setting temperature range when air temperature is selected as setting temperature.

- In the installer setting list, select Air cooling set temp category, and press [OK] button to move to the detail screen.



Value	Default	Range
Min.	18 °C	16 ~ 22 °C
Max.	30 °C	24 ~ 30 °C

NOTE

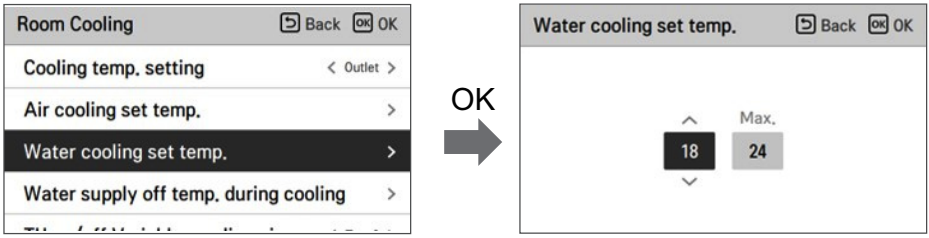
It is possible to control the unit based on room air temperature by using either remote air temperature sensor or wired remote controller (RS3).

- Remote room air sensor is an accessory (PQRSTA0) and sold separately.
- DIP switch setting (No. 5 of Indoor unit Option Switch 2) and installer setting(Select Temperature Sensor) should be set properly in order to use remote room air temperature sensor (PQRSTA0).

Water cooling set temp.

Determine cooling setting temperature range when water temperature is selected as setting temperature.

- In the installer setting list, select water cooling set temp category, and press [OK] button to move to the detail screen.



Value	Default	Range	Cooling temp. setting	
Min.	18 °C	5 ~ 20 °C	Outlet	FCU use
		16 ~ 20 °C		FCU not used
		10 ~ 20 °C	Inlet	FCU use
	20 °C	20 °C		FCU not used
Max.	24 °C	22 ~ 27 °C	All	

NOTE

Water condensation on the floor

- While cooling operation, it is very important to keep leaving water temperature higher than 16 °C. Otherwise, dew condensation can be occurred on the floor.
- If floor is in humid environment, do not set leaving water temperature below 18 °C.

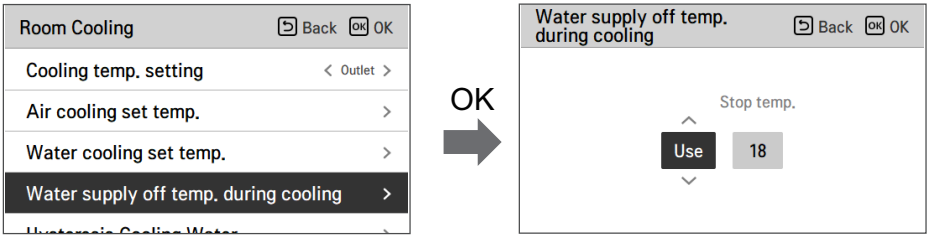
Water condensation on the radiator

- While cooling operation, cold water may not flow to the radiator. If cold water enters to the radiator, dew generation on the surface of the radiator can be occurred.

Water supply off temp. during cooling

Determine the leaving water temperature which blocks the flow into underfloor coil in cooling mode. This function is used for preventing condensation on the floor in cooling mode

- In the installer setting list, select Water supply off temp. during cooling category, and press [OK] button to move to the detail screen.



Value	Default	Range
-	Use	Use / Not Use
Stop temp.	18 °C	16 ~ 25 °C

- Stop temp. : cut-off temp. Stop temp. is valid when FCU is set as 'Use'.
- FCU : determines if FCU is installed or not.
- Example : If FCU is set as 'Use', Stop temp. setting is disabled. However, if actually FCU is NOT installed in the water loop, the unit operates continuously in cooling mode until water temperature meets desired temperature. In this case, a condensed water may form on the floor caused by cold water in the underfloor coil.
- Example : If Stop temp. is set as '20' and FCU is set as 'Not use' and actually FCU is installed in the water loop, then the Stop temp. is used and the unit stops operation in cooling mode when the leaving water temperature is below 20 °C. As a result, the unit may not offer enough cooling since the cold water with desired temperature doesn't flow into the FCU.

⚠ CAUTION

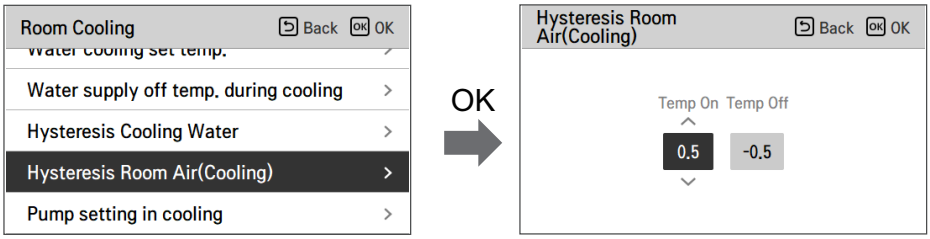
FCU Installation

- If FCU is used, related 2way valve should be installed and connected to the unit PCB.
- If FCU is set as 'Use' whereas FCU or 2way valve is NOT installed, the unit can do abnormal operation.

Hysteresis Room Air(Cooling)

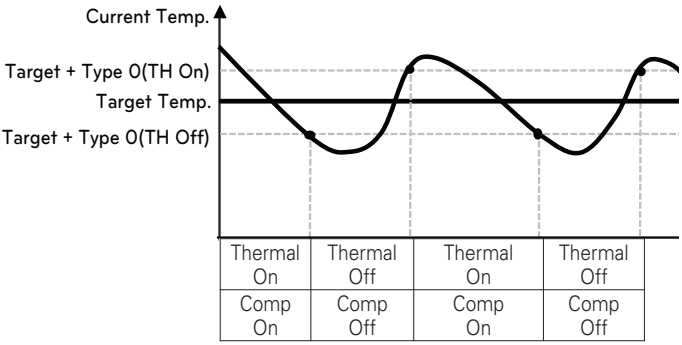
It is a function to adjust the cooling air temperature Thermal On / Off temperature according to the field environment in order to offer optimized cooling operation.

- In the Installer setting list, and select Hysteresis Room Air(Cooling) setting category, and press [OK] button to move to the detail screen.



Value	Default	Range
Temp On	0.5 °C	0 ~ 3 °C
Temp Off	-0.5 °C	-3 ~ 0 °C

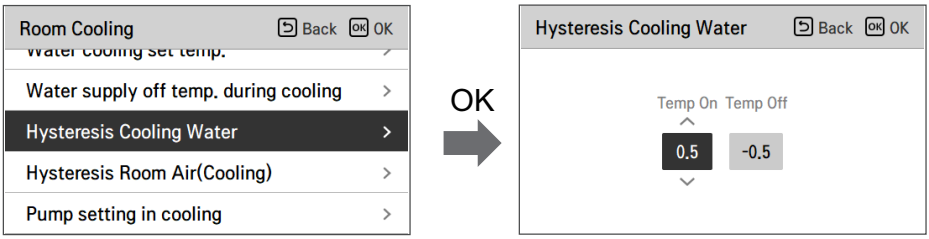
- Example : Type0 setting



Hysteresis Cooling Water

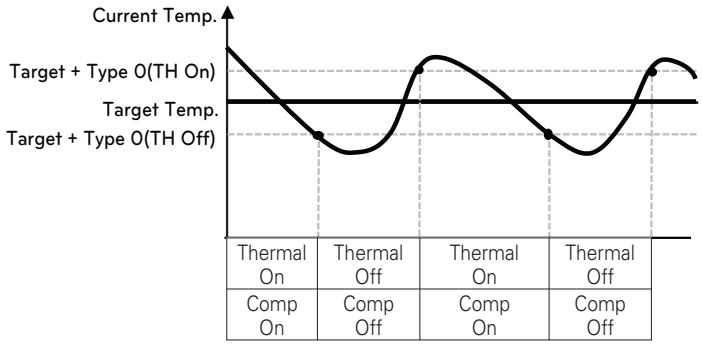
It is a function to adjust the cooling water temperature Thermal On / Off temperature according to the field environment in order to offer optimized cooling operation.

- In the Installer setting list, and select Hysteresis Cooling Water setting category, and press [OK] button to move to the detail screen.



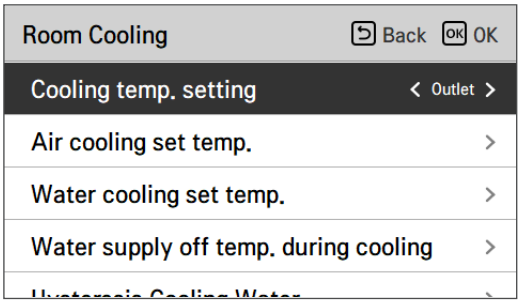
Value	Default	Range
Temp On	0.5 °C	0 ~ 3 °C
Temp Off	-0.5 °C	-3 ~ 0 °C

- Example : Type0 setting



Cooling temp. setting

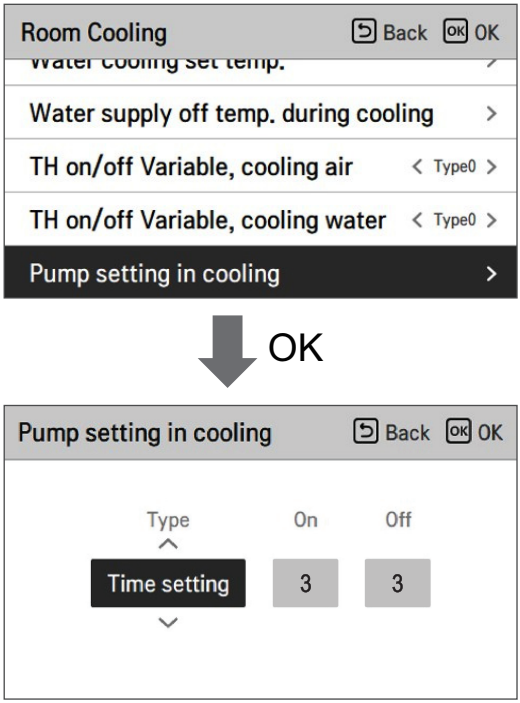
- At the water control in cooling mode, the control reference water temperature position setting
  - If the air / leaving water temperature selection setting is set to leaving water temperature
- Change setting values using [<,>(left/right)] button.
- The function is not available for some products.



Value	
Outlet (Default)	Inlet

Pump setting in cooling

- It is a function to help the water pump's mechanical life by putting the water pump's rest time
- Installer setting function to set water pump on/off interval option during thermo off condition in cooling mode.
- In the installer setting list, select Pump setting in cooling category, and press [OK] button to move to the detail screen.



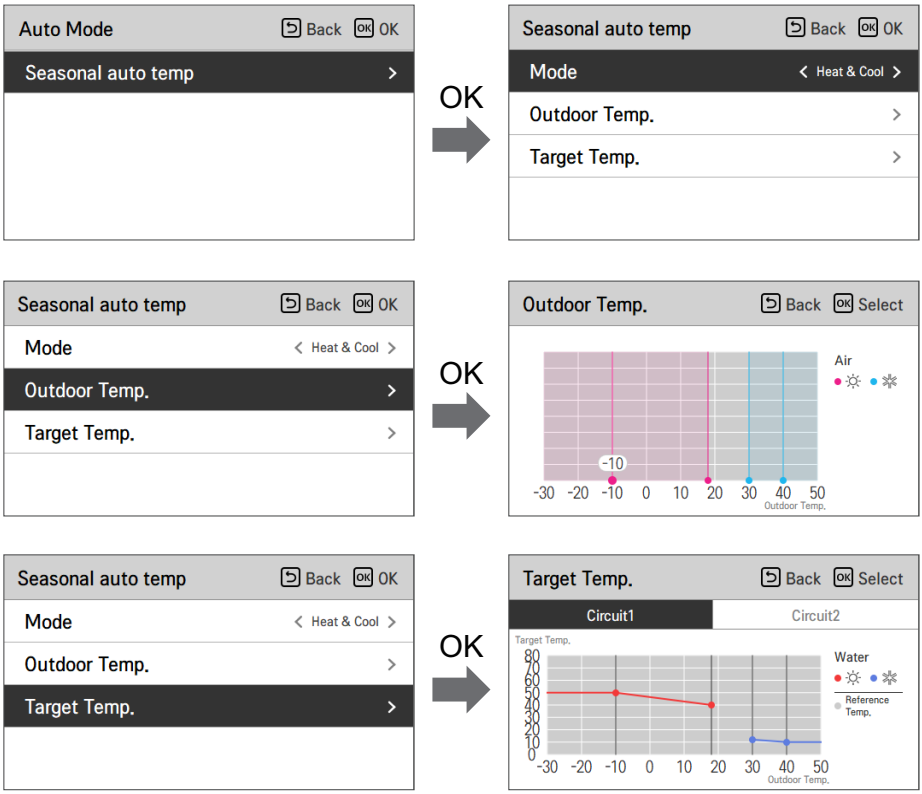
Value	Default	Range
Type	Time setting	Time setting / Continuous Operation
On	3 min	1 ~ 60 min
Off	3 min	1 ~ 60 min

* When Continuous Operation is selected, On, Off is disabled.

Seasonal auto temp.

It is the function to set the operation reference value in Seasonal Auto mode.

- In the installer setting list, select Seasonal auto temp category, and press [OK] button to move to the detail screen.



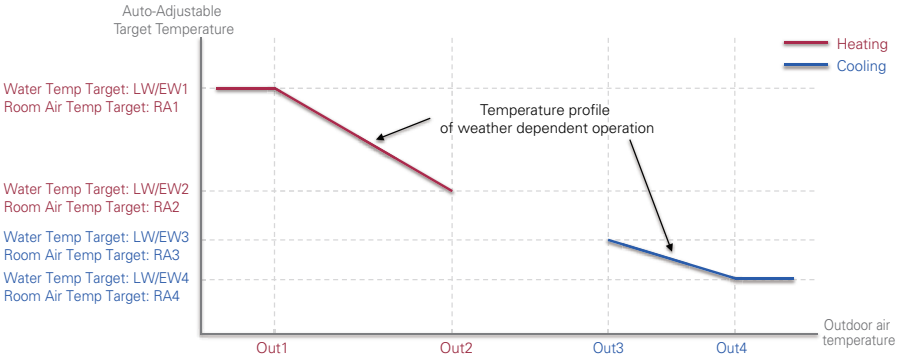
Function	Description	Range	Default (Circuit1)	Default (Circuit2)	Boundary
Outdoor1,Heat (Out1)	Heating lower ambient temp	-25 ~ 35 °C	-10 °C		Out1 ≤ Out2-1
Outdoor2,Heat (Out2)	Heating higher ambient temp		18 °C		Out2 ≥ Out1 +1 Out2 ≤ Out3 -5
Outdoor3,Cool (Out3)	Cooling lower ambient temp	10 ~ 46 °C	30 °C		Out3 ≥ Out2 +5 Out3 ≤ Out4 -1
Outdoor4,Cool (Out4)	Cooling higher ambient temp		40 °C		Out4 ≥ Out3 +1
Water1,Heat (LW1)	Heating higher water temp	Use heater : LW STD : 15~55 °C EW STD : 15~50 °C Not use heater : LW STD : 20~55 °C EW STD : 20~50 °C	50 °C	35 °C	LW1 ≥ LW2
Water 2,Heat (LW2)	Heating lower water temp		40 °C	28 °C	LW1 ≥ LW2
Water3,Cool (LW3)	Cooling higher water temp	Use FCU & 5 °C IDU : LW STD : 5~27 °C EW STD : 10~27 °C Use FCU & 6 °C IDU : LW STD : 6~27 °C EW STD : 11~27 °C Not use FCU : LW STD : 16~27 °C EW STD : 20~27 °C	12 °C	18 °C	LW3 ≥ LW4
Water4,Cool (LW4)	Cooling lower water temp		10 °C	16 °C	LW3 ≥ LW4
Air 1, Heat (RA1)	Heating higher air temp	16 ~ 30 °C	21 °C		RA1 ≥ RA2
Air 2, Heat (RA2)	Heating lower air temp		19 °C		RA1 ≥ RA2
Air 3, Cool (RA3)	Cooling higher air temp	18 ~ 30 °C	21 °C		RA3 ≥ RA4
Air 4, Cool (RA4)	Cooling lower air temp		19 °C		RA3 ≥ RA4

- Setting range: Celsius
- Seasonal Auto Driving mode: Heating, Heating & Cooling

* If heating mode is selected, heating & cooling or cooling can not be selected.

- Depending on the air / outflow control selection value, the water / air related setting value is displayed on the screen.

In this mode, setting temperature will follow outdoor temperature automatically. This mode adds the cooling season function to the conventional weather dependent operation mode.

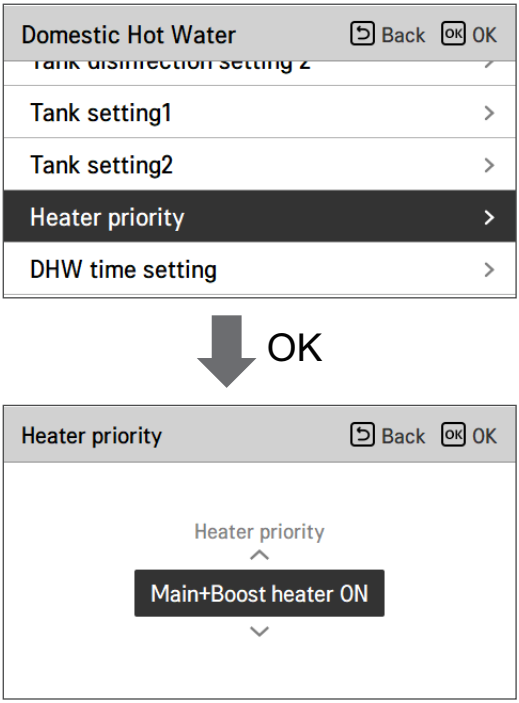


NOTE

DHW mode can be operated independently of seasonal auto temp mode.

Heater priority

- Heater priority: It is decided whether to use the boost heater for DHW operation and the backup heater for floor heating at the same time by condition.
- Example: If the heater priority is set to 'Main+Boost heater ON', the backup heater and boost heater are turned on/off according to the control logic. (It can be turned on at the same time)
  If Heater Priority is set to 'Boost heater only ON', the backup heater does not operate when the boost heater operates according to the control logic. (When the boost heater is not in operation, the backup heater operates according to the logic.)
- In the installer setting list, heater priority category, and press [OK] button to move to the detail screen.

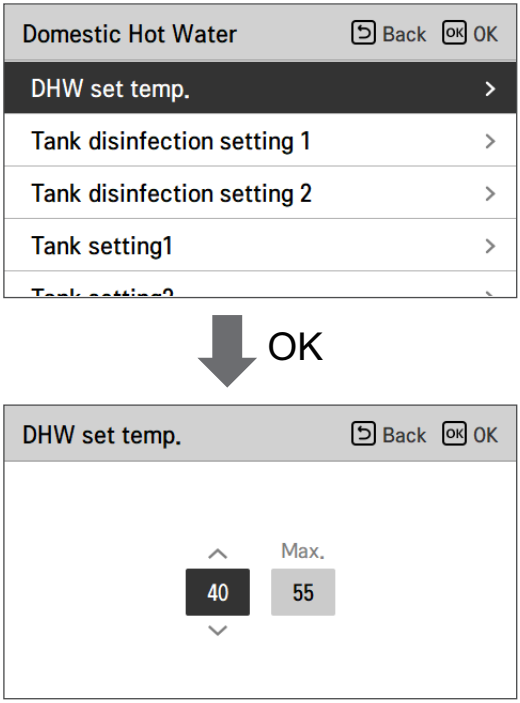


Value	
Boost heater only ON	Main+Boost heater ON (Default)

DHW set temp.

Determine heating setting temperature range when DHW temperature is selected as setting temperature

- In the installer setting list, select DHW set temp. category, and press [OK] button to move to the detail screen.



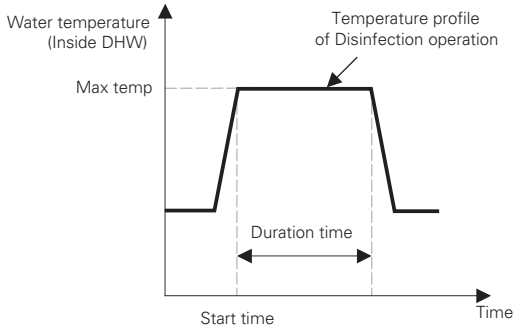
Value	Default	Range
Min.	40 °C	30 ~ 40 °C
Max.	50 °C	50 ~ 80 °C

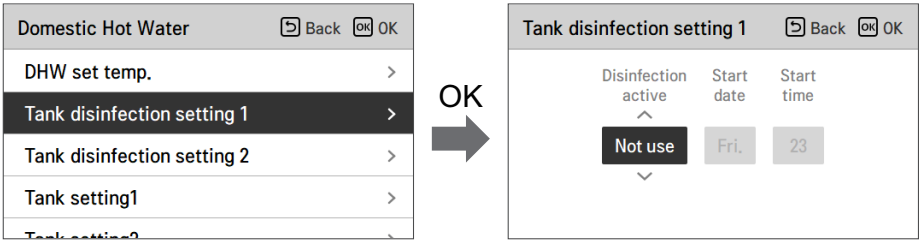
NOTE

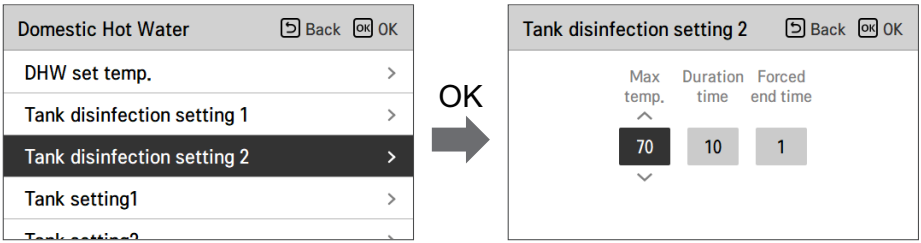
When DHW tank heater(booster heater) is in 'not used' status, Max. temperature will be limited.

Tank disinfection setting 1, 2

- Disinfection operation is special DHW tank operation mode to kill and to prevent growth of legionella inside the tank.
  - Disinfection active : Selecting enable or disable of disinfection operation.
  - Start date : Determining the date when the disinfection mode is running.
  - Start time : Determining the time when the disinfection mode is running.
  - Max temp. : Target temperature of disinfection mode.
  - Duration time : Duration of disinfection mode.







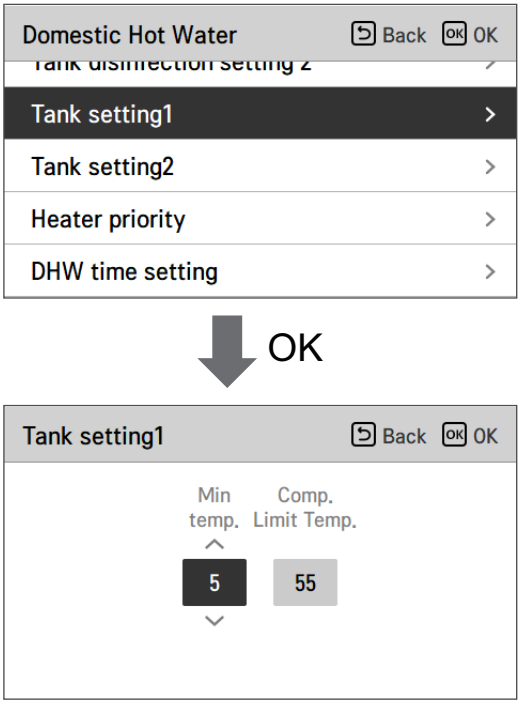
NOTE

DHW heating should be enable

- If Disinfection active is set as ' Not use', that is 'disable disinfection mode', Start date and Start time is not used.

Tank setting 1

- In the installer setting list, select tank setting 1 category, and press [OK] button to move to the detail screen.



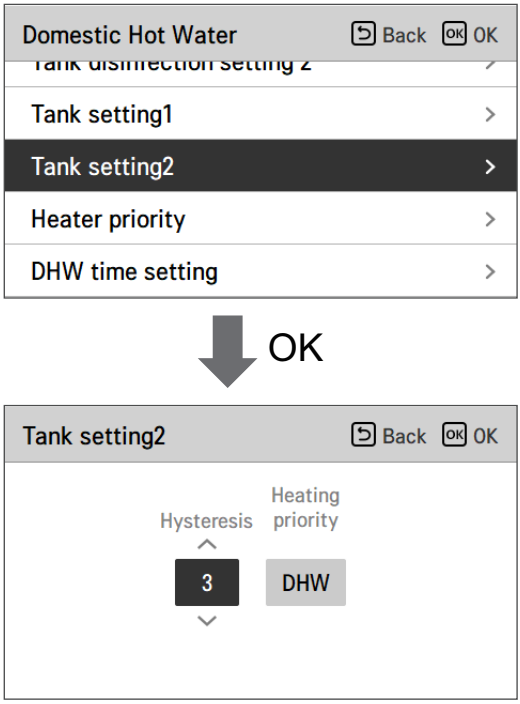
Value	Default	Range
Min. temp.	5 °C	1 ~ 30 °C
Comp. Limit Temp.	50 °C	40 ~ 50 °C

NOTE

"Max outdoor temp." means rising Max temp. by heat pump cycle.
Above this temp., only electric heater will be used.

Tank setting 2

- In the installer setting list, select tank setting 2 category, and press [OK] button to move to the detail screen.



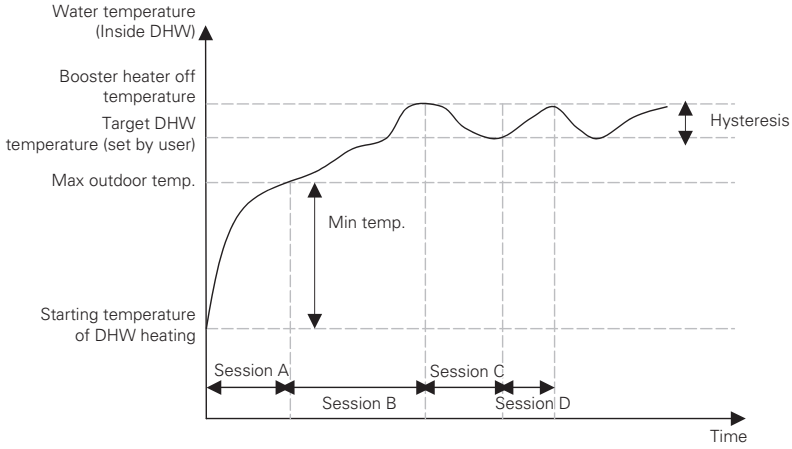
Value	Default	Range
Hysteresis	3 °C	2 ~ 4 °C
Heating priority	DHW	Floor heating / DHW

• Tank setting 1, 2

Descriptions for each parameters are as following.

- Min temp. : temperature gap from Max outdoor temp.
- Max outdoor temp. : maximum temperature generated by AWHP compressor cycle.
- Example : If Min temp. is set as '5' and Max outdoor temp. is set as '48', then Session A (see the graph) will be started when the water tank temperature is below 43 °C…. If temperature is above 48 °C…, then Session B will be started.

- Hysteresis : Temperature gap from target DHW temperature for booster heater operating. This value is required to prevent frequent On and Off of water tank heater. In the normal DHW operation, the value is set as '0' and Hysteresis is valid when heater delay time is active.
- Example : If user's target temperature is set as '70' and Hysteresis is set as '3', then the booster heater will be turned off when the water temperature is above 73 °C. The booster heater will be turned on when the water temperature is below 70 °C.
- Heating priority : Determining heating demand priority between DHW tank heating and under floor heating.
- Example : If Heating priority is set as 'DHW', that means heating priority is on DHW heating, DHW is heated by AWHP compressor cycle and booster heater. In this case the under floor can not be heated while DHW heating. On the other hand, if the Heating priority is set as 'Floor heating', that means heating priority is on under floor heating, DHW tank is ONLY heated by booster heater. In this case the under floor heating is not stopped while DHW is heated.



Session A : Heating by AWHP compressor cycle and booster heater
Session B : Heating by booster heater
Session C : No heating (booster heater is Off)
Session D : Heating by booster heater

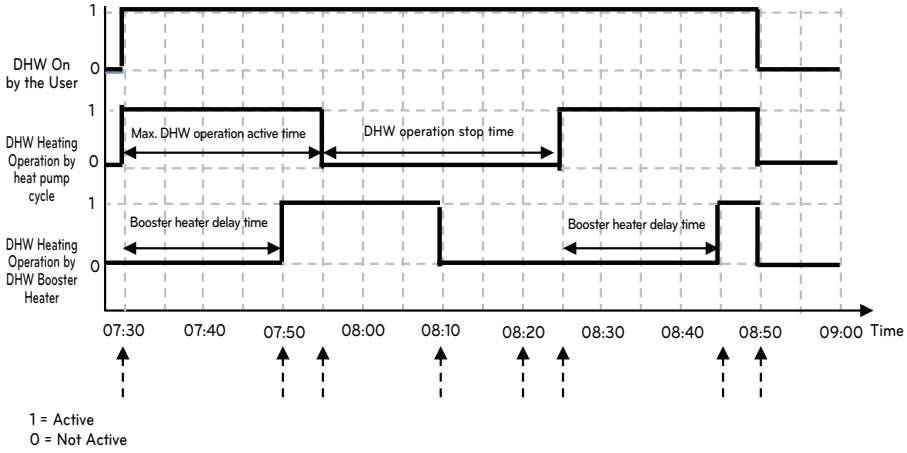
NOTE

DHW heating does not operate when it is disabled.

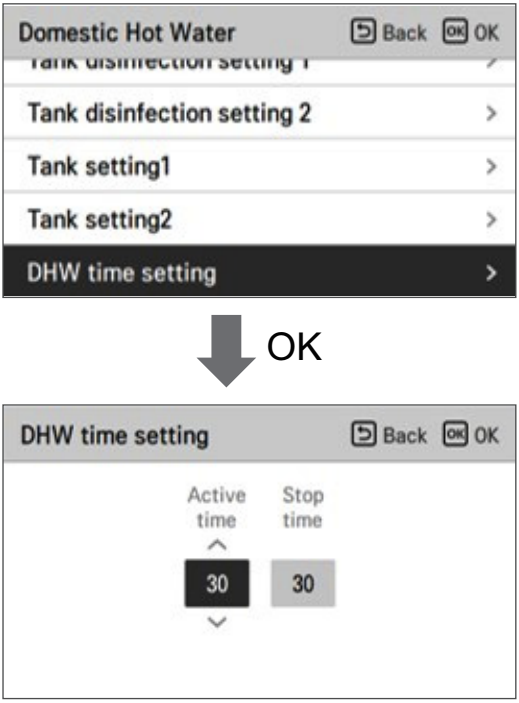
DHW time setting

Determine following time duration : operation time of DHW tank heating, stop time of DHW tank heating, and delay time of DHW tank heater operating.

- Active time : This time duration defines how long time DHW tank heating can be continued.
- Stop time : This time duration defines how long time DHW tank heating can be stopped. It is also regarded as time gap between DHW tank heating cycle.
- Boost heater delay time : This time duration defines how long time DHW tank heater will not be turned on in DHW heating operation.
- Example of timing chart :



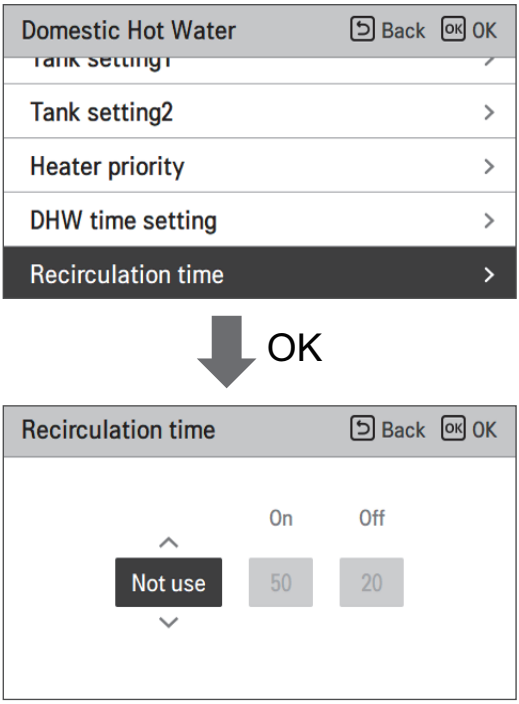
Time	Description
7:30	The user activates the DHW function in the remote controller (DHW operation starts by the heat pump cycle as the Thermo on condition is reached)
7:50	The booster heater is activated after the booster heater delay time(20 min)
7:55	The active time(25min) of DHW operation by the heat pump cycle ends and the heat pump cycle is forced to be stopped (The booster heater is continues to operate because the target temperature is not reached)
8:10	The booster heater operation ends as the target temperature is reached
8:20	DHW operation is not activated by the stop time(30 min) even though the water temperature is dropped and DHW operation condition is reached.
8:25	When the active time condition is reached, DHW operation starts again by the heat pump cycle
8:45	The booster heater is activated after the booster heater delay time(20 min)
8:50	The user deactivates the DHW function by turning it off in the remote controller



Value	Default	Range
Active time	30 min	5~95 min
Stop time	30 min	0~600 min

Recirculation time

- It is function to set recirculation water pump on/off interval option
- In the installer setting list, select Recirculation time category, and press [OK] button to move to the detail screen.

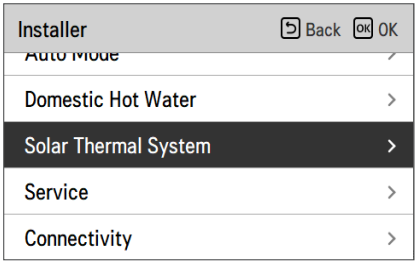


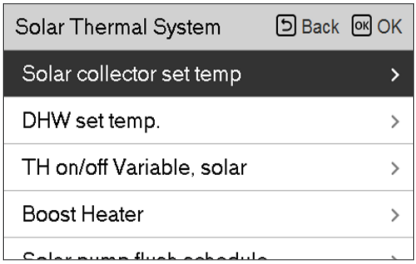
Value	Default	Range
DHW recirculation	Not use	Use / Not use
ON Time	10 min	5 ~ 60 min
OFF Time	20 min	5 ~ 60 min

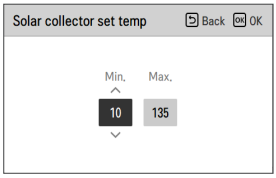
Solar Thermal System

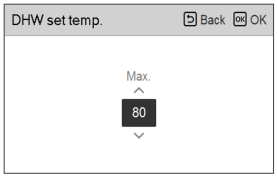
It is function to set operation reference value in Solar Thermal System.

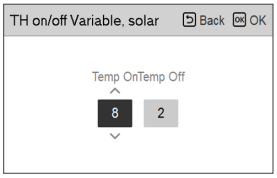
In the installer setting list, select Solar thermal system category, and press [OK] button to move to the detail screen.

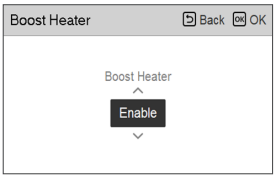


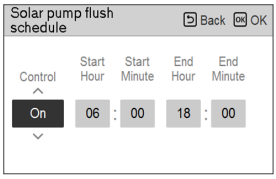


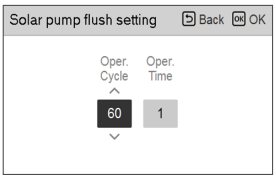


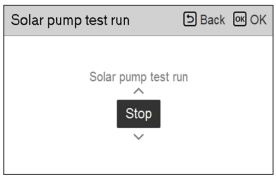












NOTE

To use this function, switch No.2 of option switch 2 must be turned ON and No.3 of option switch 2 must be turned OFF.

Descriptions for each parameters are as following.

- Solar collector set temp
  - Min temp : It is the minimum solar collector temperature at which the solar thermal system can operate.
  - Max temp : It is the maximum solar collector temperature at which the solar thermal system can operate.
- TH on/off Variable, solar
  - Temp on : It is the temperature difference between the current solar thermal temperature and DHW tank temperature at which the solar thermal system operates.
  - Temp off : It is the temperature difference between the current solar thermal temperature and DHW tank temperature at which the solar thermal system stops.
  - Example : If the current solar collector temperature is 80 °C and Temp on is set to 8 °C, the solar thermal system operates when the DHW tank temperature is less than 72 °C. In the same case, if Temp off is set to 2 °C, Solar Thermal System stops when DHW temperature is 78 °C.
- DHW Set Temp
  - Max : It is maximum temperature of DHW that can be reached by solar thermal system.
- Boost Heater
  - Enable : Booster heater can be used when operating the Solar Thermal system.
  - Disable : Booster heater cannot be used when operating the Solar Thermal system.
- Solar pump flush schedule
  - It is the function to circulate the solar water pump intermittently for solar collector temperature detection when the solar water pump does not operate for a long time. Turn on to use this function.
- Solar Pump flush setting
  - Oper.Cycle : When using the solar pump flush function, the solar water pump operates at the set time.
  - Oper.Time : When using the solar pump flush function, the solar water pump operates during the set time.

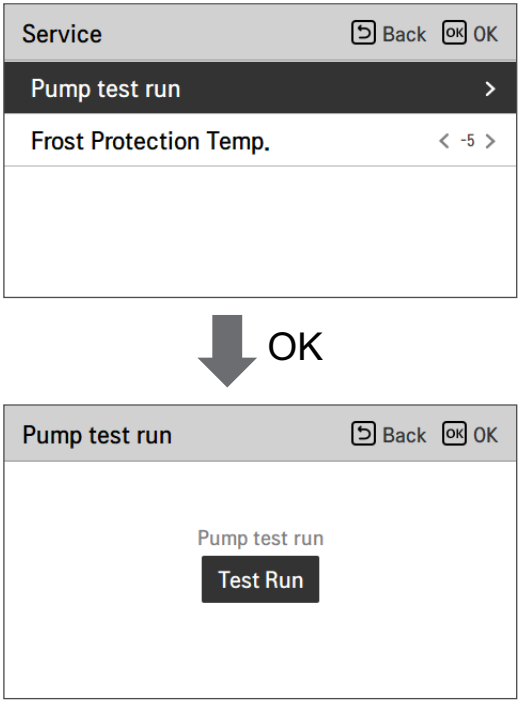
Function	Value	Range	Default
Solar collector set temp	Min	5 °C ~ 50 °C	10 °C
	Max	60 °C ~ 200 °C	95 °C
DHW set temp	Max	20 °C ~ 90 °C	80 °C
TH on/off Variable, solar	Temp On	3 °C ~ 40 °C	8 °C
	Temp Off	1 °C ~ 20 °C	2 °C
Boost Heater	Boost Heater	Enable/Disable	Enable
Solar pump flush schedule	On/OFF	On/Off	On
	Start Hour, Start Minute	00:00 ~ 24:00	6:00
	End Hour, End Minute	00:00 ~ 24:00	18:00
Solar pump test run	Pump test Run	Start/Stop	Stop
Solar pump flush setting	Oper.Cycle	30 min ~ 120 min	60 min
	Oper.Time	1 min ~ 10 min	1 min

Pump test run

The pump test run is to test run by operating the water pump for 1 hour.

This function can be used for air purging through air vents and checking flow rate and others.

- In the installer setting list, Pump Test run category, and press [OK] button to move to the detail screen.



NOTE

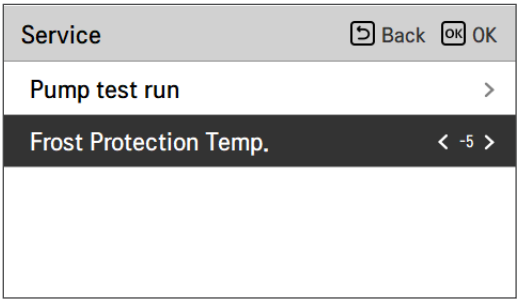
The setting for Thermostat and Dry contact should be disabled to use the Pump test run function.

Frost Protection Temp.

This function prevents the unit from freezing. This function sets the freeze protection temperature according to the concentration injected after injecting antifreeze.

Make sure to use this function only when antifreeze is added.

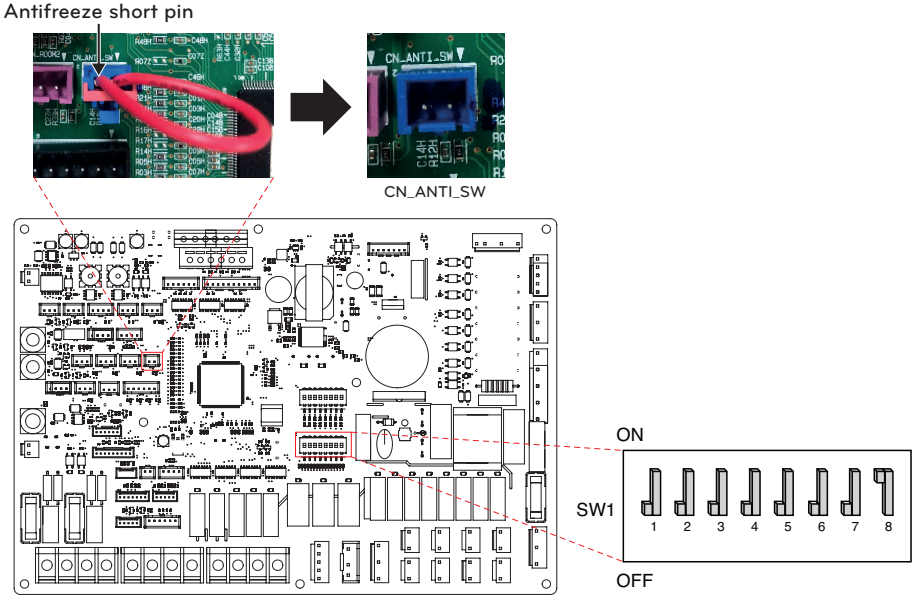
- Change setting values using [<, >(left/right)] button.
- The function is not available for some products.



Default	Range
-5 °C	-25 ~ -5 °C

NOTE

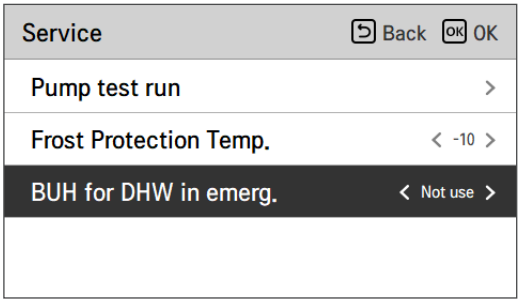
To use this function, the antifreeze short pin(CN_ANTI_SW) must be open and switch No.8 in Option SW 1 must be on.



BUH for DHW in emerg.

This function selects whether or not to heat DHW with Backup Heater when emergency operation is entered.

- Change setting values using [<, >(left/right)] button.
- The function is not available for some products.



Default	Range
Not use	Use / Not use

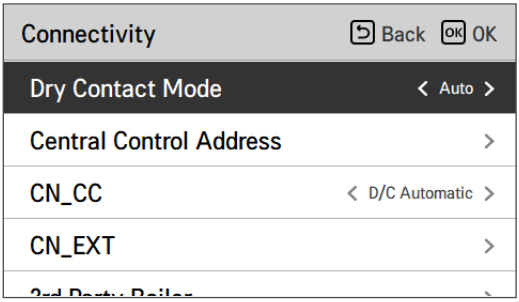
NOTE

When Use is selected, heating and hot water are switched according to the product operation logic.

Dry Contact Mode

Dry contact function is the function that can be used only when the dry contact devices is separately purchased and installed.

• Change setting values using [<,>(left/right)] button.



Value	Description
Auto (Default)	Automatically operation ON with release hard lock
Manual	Keep operation OFF with hard lock

NOTE

For dry contact mode related detail functions, refer to the individual dry contact manual.

What is dry contact?

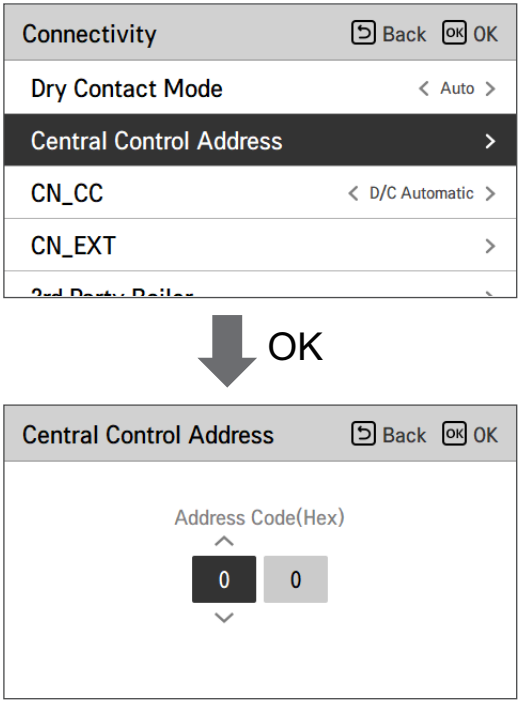
It means the contact point signal input when the hotel card key, human body detection sensor, etc. are interfacing with the unit.

Added system functionality by using external inputs (dry contacts and wet contacts).

Central Control Address

When connecting the central control, set the central control address of the unit.

- In the installer setting list, select Central Control Address category, and press [OK] button to move to the detail screen.



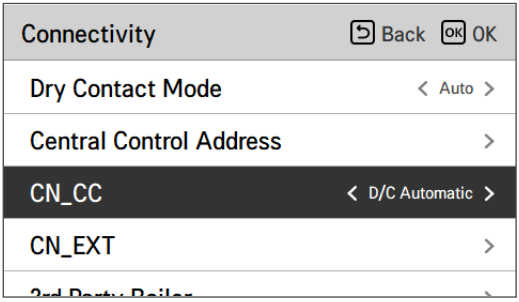
NOTE

Enter address code as hexadecimal value
Front: Central Control Gr. No.
Back side: Central control indoor the number

CN_CC

It is the function to set the usage of the unit's CN_CC port.

• Change setting values using [<,>(left/right)] button



Value	Description
D/C Automatic (Default)	When power is applied to the product, the unit when the contact point is on in Dry Contact installed state recognizes Dry Contact installation
D/C Not Installed	Do not use (install) Dry Contact
D/C Installed	Use (install) Dry Contact

NOTE

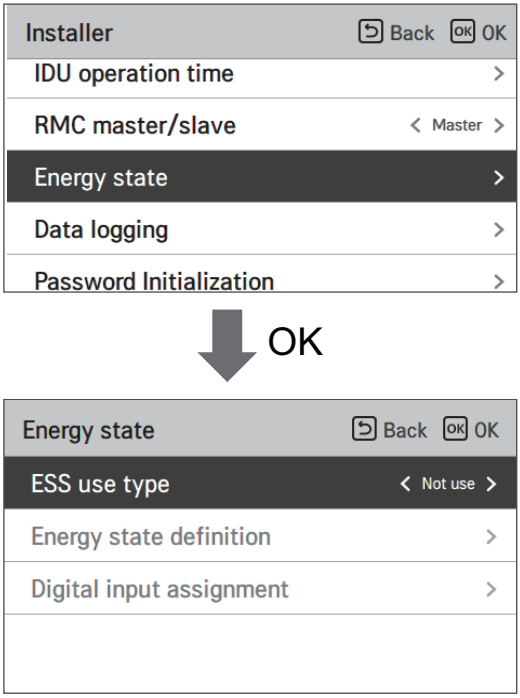
CN_CC is the device connected to the unit to recognize and control the external contact point.

Energy state

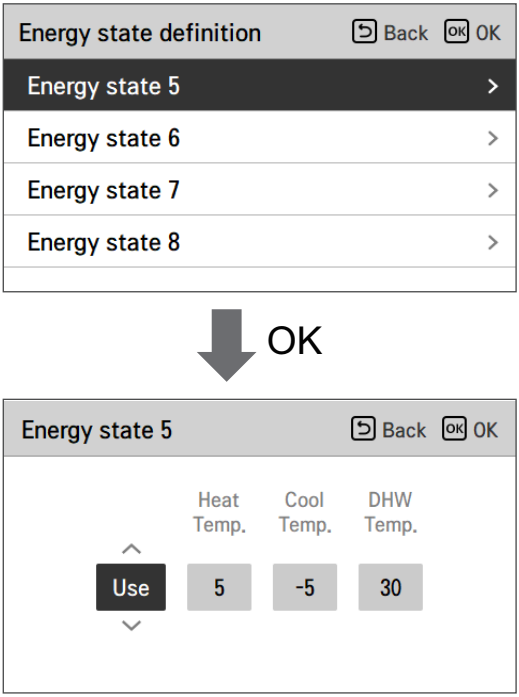
This function is to control the product according to the energy state. When the charged state of ESS is transmitted, it changes the target temperature of heating, cooling and DHW by setting value according to energy state.

Select either Signal Mode or Modbus Mode according to the connection type between the product and the ESS.

Select ThinQ Mode for wireless connection between the product and the ESS via ThinQ. This function is available only in Germany.



Value	Default
Not Use	Not use
Use Modbus	
Use Digital Input	
ThinQ	

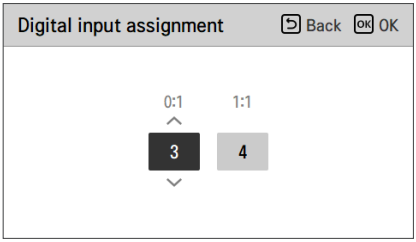


Division	Value	Default	Range	Division	Value	Default	Range
ES 1	-	Use	Use / Not Use	ES 5	-	Use	Use / Not Use
	Heat Temp.	Off	fixed		Heat Temp.	+5 °C	0 ~ 30 °C
	Cool Temp.	Off	fixed		Cool Temp.	-5 °C	-30 ~ 0 °C
	DHW Temp.	Off	fixed		DHW Temp.	+30 °C	0 ~ 50 °C
ES 2	-	Use	Use / Not Use	ES 6	-	Use	Use / Not Use
	Heat Temp.	Normal	fixed		Heat Temp.	+2 °C	0 ~ 30 °C
	Cool Temp.	Normal	fixed		Cool Temp.	-2 °C	-30 ~ 0 °C
	DHW Temp.	Normal	fixed		DHW Temp.	+10 °C	0 ~ 50 °C
ES 3	-	Use	Use / Not Use	ES 7	-	Use	Use / Not Use
	Heat Temp.	+2 °C	fixed		Heat Temp.	-2 °C	-30 ~ 0 °C
	Cool Temp.	0 °C	fixed		Cool Temp.	+2 °C	0 ~ 30 °C
	DHW Temp.	+5 °C	fixed		DHW Temp.	0 °C	-50 ~ 0 °C
ES 4	-	Use	Use / Not Use	ES 8	-	Use	Use / Not Use
	Heat Temp.	0 °C	fixed		Heat Temp.	-5 °C	-30 ~ 0 °C
	Cool Temp.	0 °C	fixed		Cool Temp.	+5 °C	0 ~ 30 °C
	DHW Temp.	80 °C	fixed		DHW Temp.	0 °C	-50 ~ 0 °C

* ES = Energy state

* ES 4 DHW Temp. 80°C is the desired temperature value, not the offset.

When Signal Mode of EES use type is selected, press the Digital Input Assignment button to set the energy state according to the input signal.

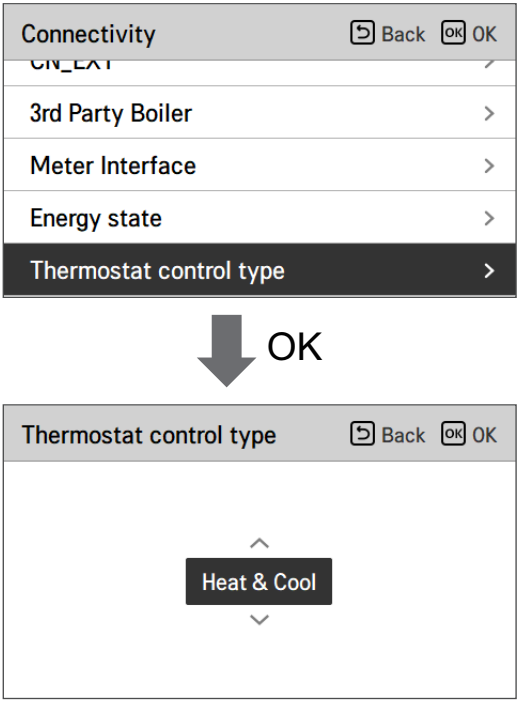


Value	Input Signal		Output state	
	TB_SG1	TB_SG2	Default	Range
X	0	0	ES2	fixed
X	1	0	ES1	fixed
0:1	0	1	ES3	ES3-ES8
1:1	1	1	ES4	

Thermostat control type

Set the type of thermostat control.

- In the Installer setting list, and select Connectivity category, and press [OK] button to move to the detail screen.

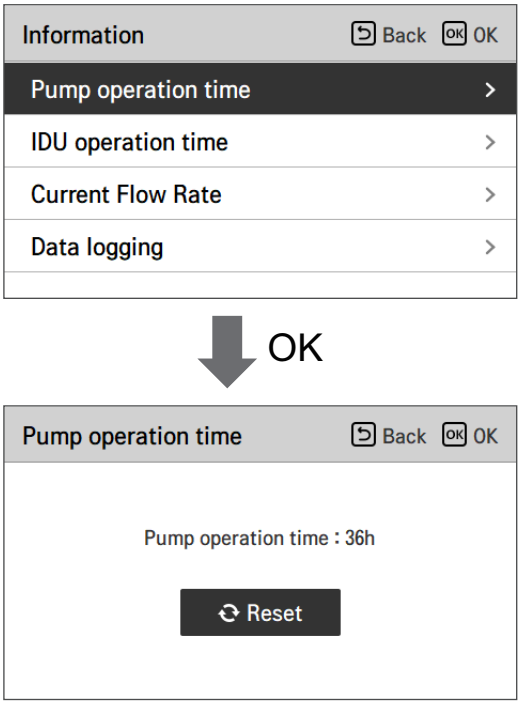


Type	
Heat & Cool (Default)	Heat & Cool / DHW

Pump operation time

It is a function to show the water pump's operation time for check mechanical life.

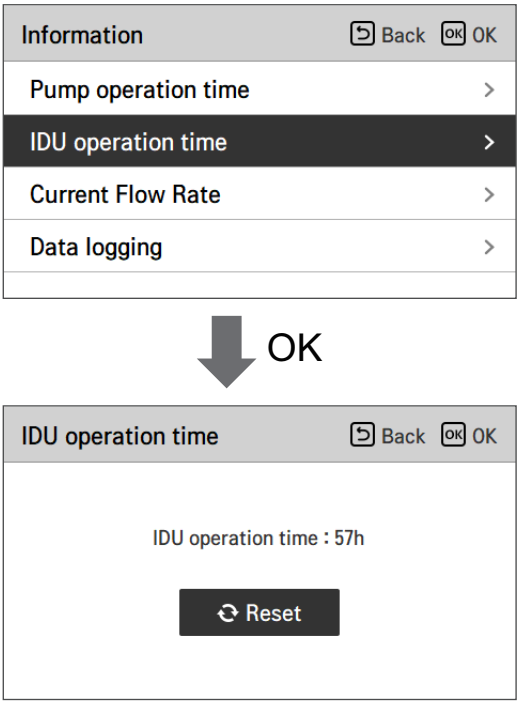
- In the Installer setting list, and select Information category, and press [OK] button to move to the detail screen.



IDU operation time

It is a function to show the Indoor Unit's operation time for check mechanical life.

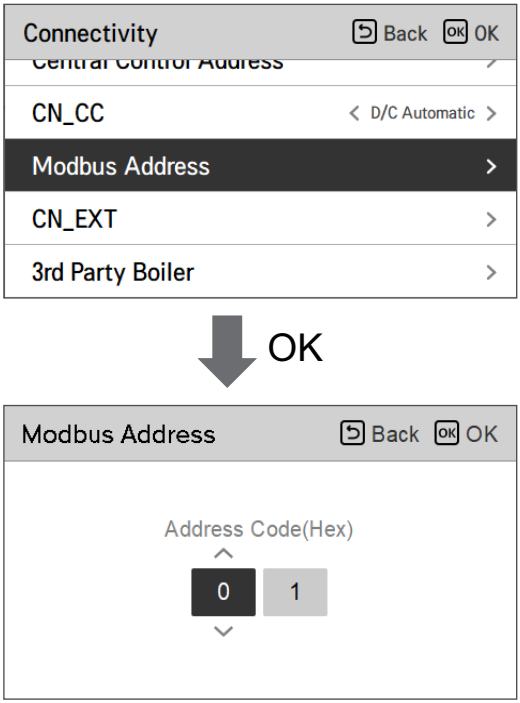
- In the Installer setting list, and select Information category, and press [OK] button to move to the detail screen.



Modbus Address

It is function to set the address of the Modbus device that is externally linked to the product. Modbus address setting function is available from indoor unit.

- In the installer setting list, select Modbus Address , and press [OK] button to move to the detail screen.



NOTE

To use this function, switch No.1 of option switch 1 must be turned ON.

Modbus gateway memory map

Baud Rate : 9 600 bps Stop Bit : 1 stop bit Parity : None Parity

Coil Register (0x01)

Register	Description	Value explanation
00001	Enable/Disable (Heating/Cooling)	0 : Operation OFF / 1 : Operation ON
00002	Enable/Disable (DHW)	0 : Operation OFF / 1 : Operation ON
00003	Silent Mode Set	0 : Silent mode OFF / 1 : Silent mode ON
00004	Trigger Disinfection operation	0 : Keep status / 1 : Operation start
00005	Emergency Stop	0 : Normal operation / 1 : Emergency stop
00006	Trigger Emergency Operation	0 : Keep status / 1 : Operation Start

Discrete Register (0x02)

Register	Description	Value explanation
10001	Water flow status	0 : Flow rate ok / 1 : Flow rate too low
10002	Water Pump status	0 : Water Pump OFF / 1 : Water Pump ON
10003	Ext. Water Pump status	0 : Water Pump OFF / 1 : Water Pump ON
10004	Compressor status	0 : Compressor OFF / 1 : Compressor ON
10005	Defrosting status	0 : Defrost OFF / 1 : Defrost ON
10006	DHW heating status (DHW Thermal On/Off)	0 : DHW inactive / 1 : DHW active
10007	DHW Tank disinfection status	0 : Disinfection inactive / 1 : Disinfection active
10008	Silent mode status	0 : Silent mode inactive / 1 : Silent mode active
10009	Cooling status	0 : No cooling / 1 : Cooling operation
10010	Solar pump status	0 : Solar pump OFF / 1: Solar pump ON
10011	Backup heater (Step 1) status	0 : OFF / 1 : ON
10012	Backup heater (Step 2) status	0 : OFF / 1 : ON
10013	DHW boost heater status	0 : OFF / 1 : ON
10014	Error status	0 : no error / 1 : error state
10015	Emergency Operation Available (Space heating/cooling)	0 : Unavailable / 1 : Available
10016	Emergency Operation Available (DHW)	0 : Unavailable / 1 : Available
10017	Mix pump status	0 : Mix pump OFF / 1 : Mix pump ON

Holding Register (0x03)

Register	Description	Value explanation
40001	Operation Mode	0 : Cooling / 4 : Heating / 3 : Auto
40002	Control method (Circuit 1/2)	0 : Water outlet temp. control 1 : Water inlet temp. control 2 : Room air control
40003	Target temp (Heating/Cooling) Circuit 1	[0.1 °C ×10]
40004	Room Air Temp. Circuit 1	[0.1 °C ×10]
40005	Shift value(Target) in auto mode Circuit 1	1K
40006	Target temp (Heating/Cooling) Circuit 2	[0.1 °C ×10]
40007	Room Air Temp. Circuit 2	[0.1 °C ×10]
40008	Shift value(Target) in auto mode Circuit 2	1K
40009	DHW Target temp.	[0.1 °C ×10]
40010	Energy state input	0 : Not Use 1 : Forced off (equal to TB_SG1=close / TB_SG2=open) 2 : Normal operation (equal to TB_SG1=open / TB_SG2=open) 3 : On-recommendation (equal to TB_SG1=open / TB_SG2=close) 4 : On-command (equal to TB_SG1=close / TB_SG2=close) 5 : On-command step 2 (++ Energy Consumption compared to Normal) 6 : On-recommendation Step 1 (+ Energy Consumption compared to Normal) 7 : Energy Saving mode (- Energy Consumption compared to Normal) 8 : Super Energy saving mode (– Energy Consumption compared to Normal)

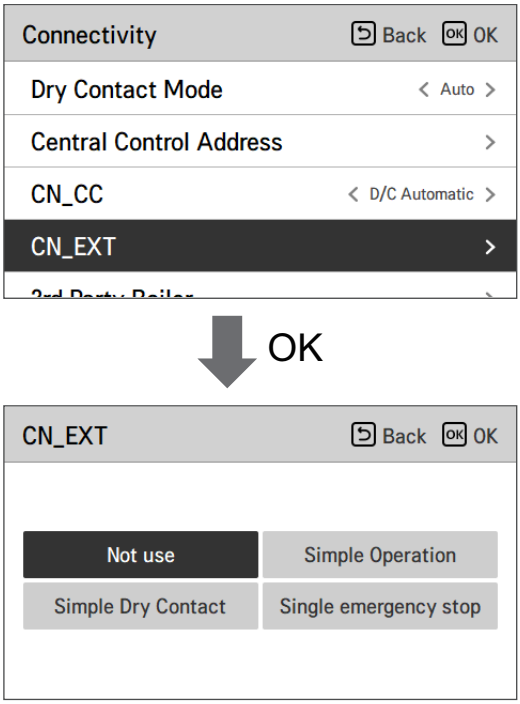
Input Register (0x04)

Register	Description	Value explanation
30001	Error Code	Error Code
30002	ODU operation Cycle	0 : Standby(OFF) / 1 : Cooling / 2 : Heating
30003	Water inlet temp.	[0.1 °C ×10]
30004	Water outlet temp.	[0.1 °C ×10]
30005	Backup heater outlet temp.	[0.1 °C ×10]
30006	DHW tank water temp.	[0.1 °C ×10]
30007	Solar collector temp.	[0.1 °C ×10]
30008	Room air temp. (Circuit 1)	[0.1 °C ×10]
30009	Current Flow rate	[0.1 LPM ×10]
30010	Flow temp. (Circuit 2)	[0.1 °C ×10]
30011	Room air temp. (Circuit 2)	[0.1 °C ×10]
30012	Energy State input	0 : Energy state 0; 1: Energy state 1….
30013	Outdoor Air temp.	[0.1 °C ×10]
39998	Produc Group	0x8X (0x80, 0x83, 0x88, 0x89)
39999	Product Info.	Split : 0 / Monobloc : 3 / High Temp. : 4 / Medium Temp. : 5 / System Boiler : 6

CN_EXT

It is a function to control external input and output according to DI type set by customer using CN-EXT Port.

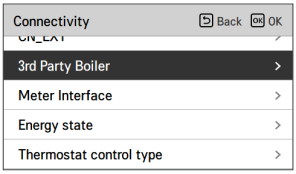
- In the installer setting list, select CN-EXT Port category, and press [OK] button to move to the detail screen.

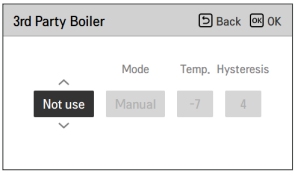


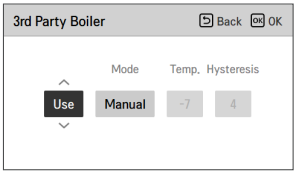
Value	Contact Input	Operation	Remark
Not Use	Open	-	-
	Close	-	-
Simple Operation	Open	OFF	-
	Close	ON	-
Simple Dry Contact	Open	OFF + Hard Lock	Follows Dry Contact mode : - Auto mode : if contact input closes, operation On - Manual mode : if contact input closes, keep in previous state
	Close	ON	
Single emergency stop	Open	Always OFF	Priority : - Emergency stop Lock > Central control Lock > Dry Lock
	Close	Emergency stop released	

3rd Party Boiler

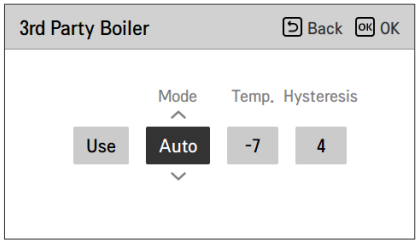
This function is to configure the 3rd party boiler to be controlled.

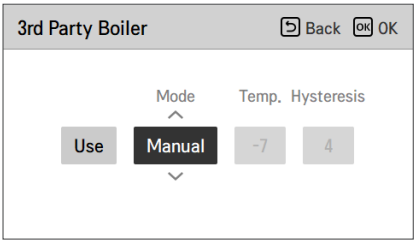




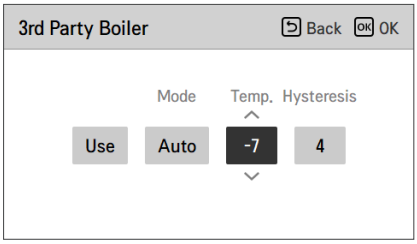


If the status of this function is “Use”, you can choose control mode of boiler, Auto or Manual.





If the mode of this function is set to “Auto”, you can set temperature of the boiler and hysteresis, respectively.



External boiler ON condition :

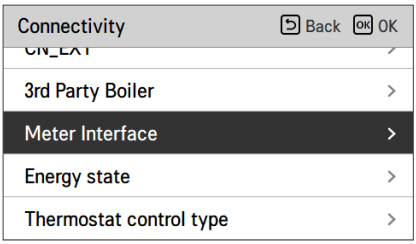
- If outdoor temperature ≤ external boiler operation temperature value (installer setting), turn off the indoor unit and operate the external boiler.

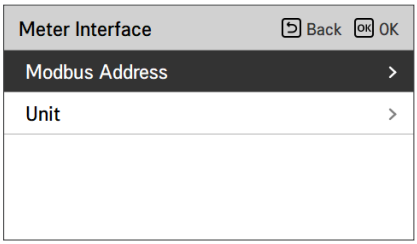
External boiler OFF condition :

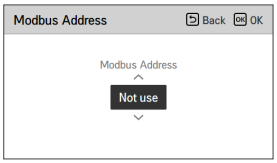
- If External air temperature ≥ external boiler operation temperature value (installer setting) + Hysteresis (installer setting), turn off external boiler operation and operate indoor unit

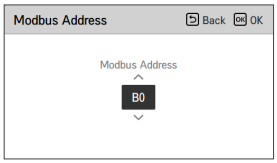
Meter Interface

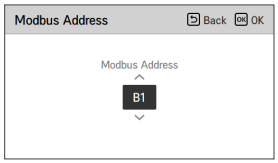
It is the function that can check the status of energy and power on screen. It collects and calculates power or calorie data to create data for energy monitoring and energy warning alarm pop-ups. This function can be activated in installer mode.



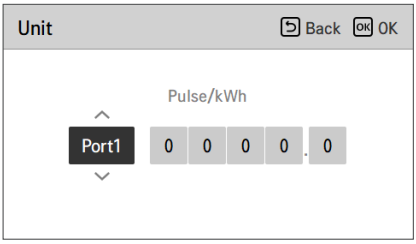


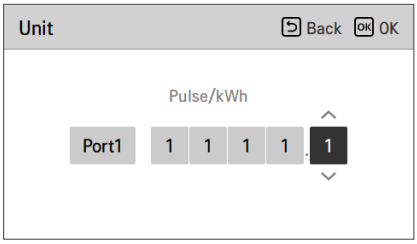






There are 2 options, modbus address and unit, in this function. Activating the modbus address option, you choose one address(B0 or B1) or don't use. Then, you set the port and specification in range of 0000.0~9999.9[pulse/kW] as shown in the figure below.

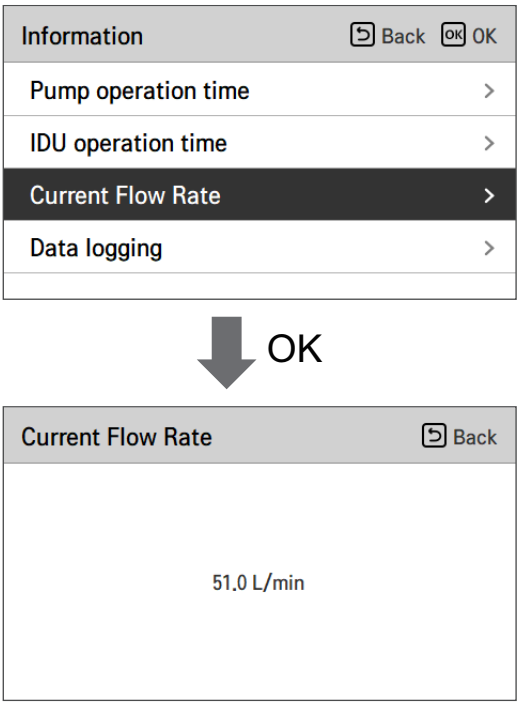




Current flow rate

It is the function to check the current flow rate.

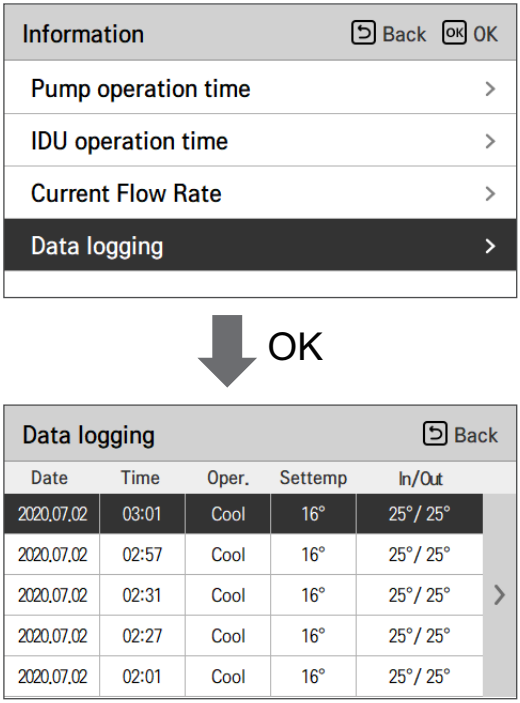
- In the installer setting list, select Current Flow Rate category, and press [OK] button to move to the detail screen. The current flow rate can be checked. (Range : 5 ~ 80 L/min)
- The function is not available for some products.



Data logging

This function is to check the operation and error history.

- In the installer setting list, select Data logging category, and press [OK] button to move to the detail screen.



NOTE

Error history lookup range: 50

Error history information

Item: date, time, mode (including Off), set temperature, incoming temperature, outgoing temperature, room temperature, Hot water operation / stop, Hot water set temperature, Hot water temperature, Outdoor unit On / Off, Error code

Number of Display: Within 50

- Save criteria ν

ν Error occurred, released ON / OFF of outdoor unit operation.

COMMISSIONING

If everything is going well until now, it is time to start the operation and to take advantages of THERMA V.

Before starting operation, pre-check points are described in this chapter. Some comments about maintenance and how to do troubleshooting are presented.

Check List before Starting Operation

⚠ CAUTION

Turn off the power before changing wiring or handling product.

No	Category	Item	Check Point
1	Electricity	Field wiring	• All switches having contacts for different poles should be wired tightly according to regional or national legislation. • Only qualified person can proceed wiring. • Wiring and local-supplied electric parts should be complied with European and regional regulations. • Wiring should be following the wiring diagram supplied with the product.
2		Protective devices	• Install ELB (earth leakage breaker) with 30 mA. • ELB inside the control box of the unit should be turned on before starting operation.
3		Earth wiring	• Earth should be connected. Do not earth to gas or city water pipe, metallic section of a building, surge absorber, etc.
4		Power supply	• Use dedicated power line.
5		Terminal block wiring	• Connections on the terminal block (inside the control box of the unit) should be tightened.
6	Water	Charged water pressure	• After water charging, the pressure gauge (in front of the unit) should indicate 2.0~2.5 bar. Do not exceed 3.0 bar.
7		Air purge	• During water charging, air should be taken out through the hole of the air purge. • If water does not splash out when the tip (at the top of the hole) is pressed, then air purging is not completed yet. If well purged, the water will splash out like fountain. • Be careful when testing air purge. Splashed water may make your dress wet.
8		Shut-off valve	• Two shut-off valves (located at the end of water inlet pipe and water outlet pipe of the unit) should be open.
9		By-pass valve	• By-pass valve should be installed and adjusted to secure enough water flow rate. If water flow rate is low, flow switch error (CH14) can be occurred.
10	Product Installation	Hang to the wall	• As the unit is hung on the wall, vibration or noise can be heard if the unit is not fixed tightly. • If the unit is not fixed tightly, it can fall down during operation.
11		Parts inspection	• There should be no apparently damaged parts inside the unit.
12		Refrigerant leakage	• Refrigerant leakage degrades the performance. If leakage found, contact qualified LG air conditioning installation person.
13		Drainage treatment	• While cooling operation, condensed dew can drop down to the bottom of the unit. In this case, prepare drainage treatment (for example, vessel to contain condensed dew) to avoid water drop.

To assure best performance of THERMA V., it is required to perform periodical check and maintenance. It is recommended to proceed following check list for once a year.

⚠ CAUTION

Turn off the power before proceeding maintenance.

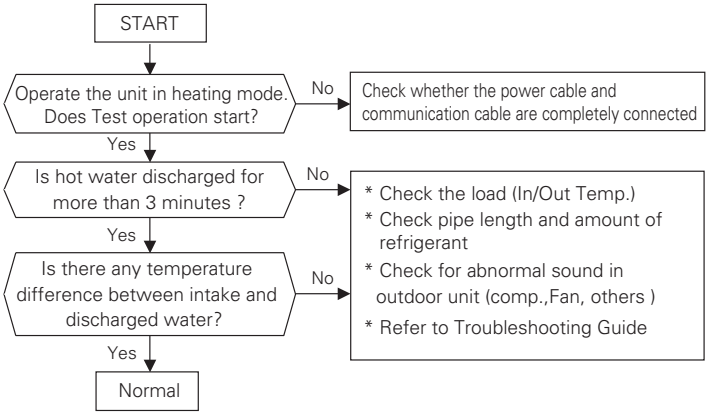
No	Category	Item	Check Point
1	Water	Water pressure	• In normal state, the pressure gauge (in front of the unit) should indicate 2.0~2.5 bar. • If the pressure is less than 0.3 bar, please recharge the water.
2		Strainer (Water filter)	• Close the shut-off valves and disassemble strainer. Then wash the strainer to make it clean. • While disassembling the strainer, be careful for water flood out.
3		Safety valve	• Open the switch of the safety valve and check if water is flood out through the drain hose. • After checking, close the safety valve.
4	Electricity	Terminal block wiring	• Look and inspect if there is loosen or defected connection on the terminal block.

Starting Operation

Check before Starting Operation

1	Check to see whether there is any refrigerant leakage, and check whether the power or transmission cable is connected properly.
2	Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less. NOTE: Never carry out mega ohm check over terminal control board. Otherwise the control board may break. Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground may decrease to approx. 2.0 MΩ as a result of refrigerant accumulation in the internal compressor. If the insulation resistance is less than 2.0 MΩ, turn on the main power supply.
3	When the power is applied for the first time, operate the product after preheating for 2 hours. To protect the unit by increasing the oil temperature of the compressor.

Starting Operation flow chart



Airborne Noise Emission

The A-weighted sound pressure emitted by this product is below 70 dB.

** The noise level can vary depending on the site.

The figures quoted are emission level and are not necessarily safe working levels.

Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required.

Factor that influence the actual level of exposure of the workforce include the characteristics of the work room and the other sources of noise, i.e. the number of equipment and other adjacent processes and the length of time for which an operator exposed to the noise.

Also, the permissible exposure level can vary from country to country.

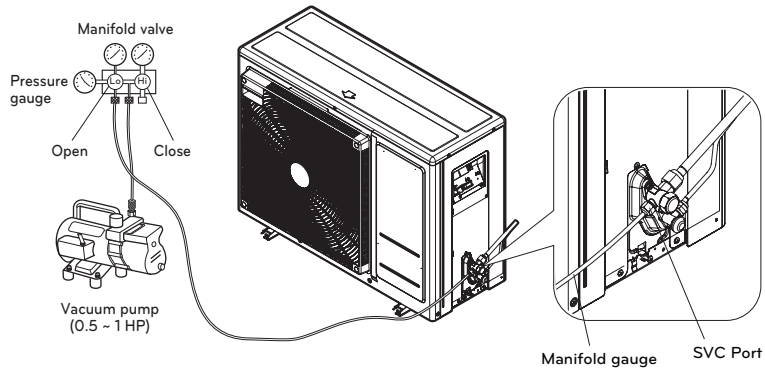
This information, however, will enable the user of the equipment to make a better evaluation of the hazard and risk.

Vacuum & Charge of Refrigerant

By default, the product was charged of refrigerant.
Vacuum and refrigerant charge, If there is leak refrigerant.

1. Vacuum

To work of vacuum action. when the leak of refrigerant.

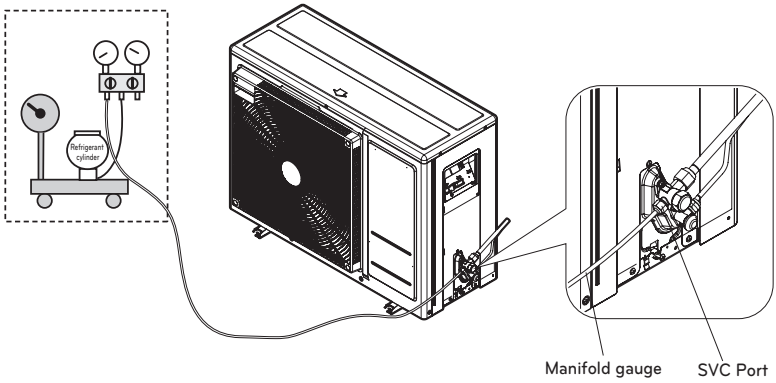


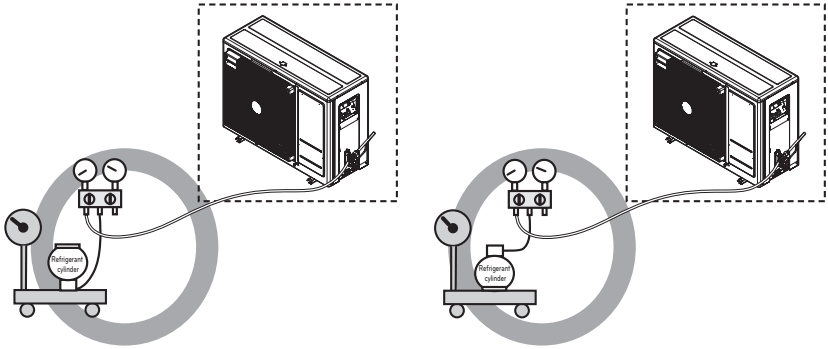
When selecting a vacuum, you should select one which is capable of achieving 0.2 Torr of ultimate vacuum. Degree of vacuum is expressed in Torr, micron,mmHg, and Pascal (Pa). The units correlate as follows:

	Unit	Standard atmospheric pressure	Perfect vacuum
Gauge Pressure	Pa	0	-1.033
Absolute Pressure	Pa	1.033	0
Torr	Torr	760	0
Micron	Micron	760 000	0
mmHg	mmHg	0	760
Pa	Pa	1 013.33	0

2. Charge of refrigerant

You should be charged after vacuum.
You can see amount of refrigerant at quality label.
Please to charge at cooling mode when there is not full charging.

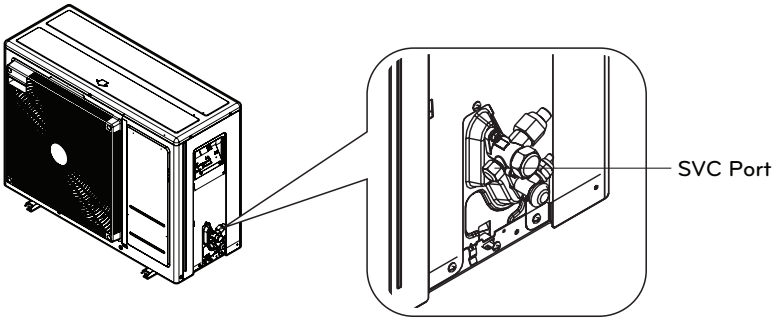




* It is recommended to charge the refrigerant container upside down.

3. Location of SVC port

1Ø : 4 kW, 6 kW



Trouble shooting

If THERMA V operates not properly or it does not start operation, please check following list.

⚠ CAUTION

Turn off the power before proceeding troubleshooting.

Troubleshooting for Problem while Operation

No	Problem	Reason	Solution
1	Heating or Cooling is not satisfactory.	• Setting target temperature is not proper.	• Set target temperature correctly. • Check if temperature is water-based or air-based. See 'Remote sensor active' and 'Temp. sensor selection'
		• Charged water is not enough.	• Check pressure gauge and charge more water until pressure gauge is indication 2~2.5 Bar
		• Water flow rate is low.	• Check if strainer gathers too much particles. If so, strainer should be cleaned. • Check if pressure gauge indicates above 4 Bar • Check if water pipe is getting closed due to stacked particles or lime.
2	Although electric power supply is OK (remote controller displays information), the unit does not start working.	• Water inlet temperature is too high.	• If water inlet temperature is above 57 °C, the unit does not operated for the sake of system protection
		• Water inlet temperature is too low.	• If water inlet temperature is below 5 °C in cooling operation, the unit does not operated for the sake of system protection. Wait while unit warms up the water inlet temperature. • If water inlet temperature is below 15 °C in heating operation, the unit does not operated for the sake of system protection. Wait while unit warms up to 18 °C the water inlet temperature. • If you are not using the back up heater accessory (HA**1M E1), increase the water temperature with the external heat source (heater, boiler). If the problem persists, contact your dealer. • If you want to use the screed drying function, be sure to purchase and install back up hater accessories (HA**1M E1).
3	Water pump noise.	• Air purging is not completely finished.	• Open the cap of air purge and charge more water until pressure gauge is indicating 2~2.5 Bar • If water does not splash out when the tip(at the top of the hole) is pressed, then air purging is not completed yet. If well purged, the water will splash out like fountain.
		• Water pressure is low.	• Check if pressure gauge indicates above 0.3 Bar. • Check if the expansion tank and pressure gauge operates well.
4	Water is flood out through drain hose.	• Too much water is charged.	• Flood out water by opening the switch of the safety valve until pressure gauge is indicating 2~2.5 Bar.
		• Expansion tank is damaged.	• Replace the expansion tank.
5	DHW is not hot.	• Thermal protector of water tank heater is activated.	• Open the side panel of the DHW tank and push the reset button of the thermal protector. (for more detail information, please refer to installation manual of DHW tank.
		• DHW Heating is disabled.	• Select DHW Heating Operation and identify if icon is displayed on the remote controller.

Troubleshooting for Error Code

Display code	Title	Cause of error	Check point & Normal condition
1	Problem in remote room air sensor	• Incorrect connection between sensor and PCB(Heater). • PCB(Heater) fault • Sensor fault	• Resistance: 10 kΩ at 25 centigrade (unplugged) → for Remote room air sensor • Resistance: 5 kΩ at 25 centigrade (unplugged) → for all sensors EXCEPT remote room air sensor • Voltage: 2.5 V DC at 25 centigrade (plugged) (for all sensors) • Refer resistance-temperature table to check in different temperature
2	Problem in refrigerant (inlet side) sensor		
6	Problem in refrigerant (outlet side) sensor		
8	Problem in water tank sensor		
13	Problem in solar pipe sensor		
16	Problems in sensors		
17	Problem in water-inlet sensor		
18	Problem in water-outlet sensor		
19	Problem in Electric heater outlet sensor		
10	BLDC Water pump Lock	Restriction of BLDC Water pump	• BLDC Water pump defect / assembly condition abnormal • Fan lock by foreign material
3	Bad communication between remote controller and unit.	• Incorrect connection between sensor and PCB(Heater) • PCB(Heater) fault • Sensor fault	• Wire connection between remote controller and Main PCB assembly(Heater) should be tight • Output voltage of PCB should be 12 V DC
5	Bad communication between Main PCB assembly(Heater) and Main PCB assembly(Inverter) of the unit.	• The connector for transmission is disconnected • The connecting wires are misconnected • The communication line is broken • Main PCB assembly(Inverter) is abnormal • Main PCB assembly(Heater) is abnormal	• Wire connection between remote control panel and Main PCB assembly(Heater) should be tight.
53			
9	PCB program (EEPROM) fault	• Electrical or mechanical damage a the EEPROM	• This error can not be permitted

Display code	Title	Cause of error	Check point & Normal condition
14	Problem in flow sensor	• Water Pump ON. : If flow rate is not more than 5 LPM or not less than 80 LPM, detect it for 15 seconds. • Water Pump OFF. : If flow rate is not less than 5 LPM, detect it for 15 seconds.	• Display the flow rate value that received from the indoor unit. (Range : 5 ~ 80 LPM)
		If flow rate is not more than minimum, detect it for 15 seconds during pump operation. - Minimum flow rate : (4,6 kW) 5 LPM	• Display the flow rate value on the remote controller. • Make sure there is no leakage. • Make sure the strainer or water pipe is not clogged. • Check the installation of the external pump. • Check the circulation pump. • Check the flow sensor.
232	Problem in Water Flow sensor	• Incorrect connection between sensor and main PCB of Indoor unit. • PCB fault • Sensor fault	• Display the flow rate value on the remote controller. • Voltage : 1.22 V at 23 LPM (plugged) • Refer voltage-pressure table to check in different flow rate.
231	Problem in Water Pressure sensor	• Incorrect connection between sensor and main PCB of Indoor unit. • PCB fault • Sensor fault	• Display the water pressure value on the remote controller. • Voltage : 0.65 V at 1.0 bar (plugged) • Refer voltage-pressure table to check in different pressure.
15	Water pipe overheated	• Abnormal operation of electric heater • Leaving water temperature is above 55 °C	• If there is no problem in electric heater control, possible maximum leaving water temperature is 55 °C
20	Thermal fuse is damaged	• Thermal fuse is cut off by abnormal overheating of internal electric heater • Mechanical fault at thermal fuse • Wire is damaged	• This error will not be happened if temperature of electric heater tank is below 80 °C
21	DC PEAK (IPM Fault)	• Instant over current • Over Rated current • Poor insulation of IPM	• An instant over current in the U,V,W phase - Comp lock - The abnormal connection of U,V,W • Over load condition - Overcharging of refrigerant Pipe length. Outdoor Fan is stop • Poor insulation of compressor
22	Max. C/T	Input Over Current	• Malfunction of Compressor • Blocking of Pipe • Low Voltage Input • Refrigerant, Pipe length, Blocked...
23	DC Link High / Low Volt	• DC Link Voltage is above 420 V DC • DC Link Voltage is below 140 V DC	• Check CN_(L), CN_(N) Connection • Check Input Voltage • Check PCB DC Link voltage sensor parts

Display code	Title	Cause of error	Check point & Normal condition
26	DC Compressor Position	• Compressor Starting fail error	• Check the connection of comp wire "U,V,W" • Malfunction of compressor • Check the component of "IPM", detection parts.
27	AC Input Instant over Current Error	PCB(Inverter) input current is over 100 A(peak) for 2 us	• Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) • Compressor damage (Insulation damage/Motor damage) • Input voltage abnormal (L,N) • Power line assemble condition abnormal • PCB assembly 1 Damage (input current sensing part)
29	Inverter compressor over current	(HM**1M U*3) Inverter Compressor input current is 30 A. (HM**3M U*3) Inverter Compressor input current is 24 A.	• Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) • Compressor damage(Insulation damage/Motor damage) • Input voltage low • ODU PCB assembly 1 damage
32	High temperature in Discharge pipe of the inverter compressor	• Overload operation (Outdoor fan constraint, screened, blocked) • Refrigerant leakage (insufficient) • Poor INV Comp Discharge sensor • LEV connector displaced / poor LEV assembly	• Check outdoor fan constraint/ screened/ flow structure • Check refrigerant leakage • Check if the sensor is normal • Check the status of EEV assembly
35	Low Presser Error	Excessive decrease of low pressure	• Defective low pressure sensor • Defective unit fan • Refrigerant shortage/leakage • Deformation because of damage of refrigerant pipe • Defective unit EEV • Covering / clogging (unit covering during the cooling mode / unit filter clogging during heating mode) • SVC valve clogging • Defective unit PCB(Inverter) • Defective unit pipe sensor
41	Problem in D-pipe temperature sensor	• Open / Short • Soldered poorly • Internal circuit error	• Bad connection of thermistor connector • Defect of thermistor connector (Open/Short) • Defect of outdoor PCB(Inverter)
43	Problem in high pressure sensor	Abnormal value of sensor (Open/Short)	• Bad connection of connector PCB(Inverter) • Bad connection high pressure connector • Defect of high pressure connector (Open/Short) • Defect of connector PCB(Inverter) (Open/Short) • Defect of PCB(Inverter)
44	Problem in outdoor air temperature sensor	• Open / Short • Soldered poorly • Internal circuit error	• Bad connection of thermistor connector • Defect of thermistor connector (Open/Short) • Defect of outdoor PCB(Inverter)

Display code	Title	Cause of error	Check point & Normal condition
45	Problem in Cond. middle pipe temperature sensor	• Open / Short • Soldered poorly • Internal circuit error	• Bad connection of thermistor connector • Defect of thermistor connector (Open/Short) • Defect of outdoor PCB(Inverter)
46	Problem in suction pipe temperature sensor	• Open / Short • Soldered poorly • Internal circuit error	• Bad connection of thermistor connector • Defect of thermistor connector (Open/Short) • Defect of outdoor PCB(Inverter)
52	PCB Communication Error	Checking the communication state between Main PCB and Inverter PCB	• Generation of noise source interfering with communication
54	Open and Reverse Phase Error	Prevention of phase unbalance and prevention of reverse rotation of constant-rate compressor	• Main power wiring fault
60	PCB(Inverter) & Main EEPROM check sum error	EEPROM Access error and Check SUM error	• EEPROM contact defect/wrong insertion • Different EEPROM Version • ODU Inverter & Main PCB assembly 1 damage
61	High temperature in Cond. Pipe	• Overload operation (Outdoor fan constraint, screened, blocked) • Unit heat exchanger contaminated • EEV connector displaced / poor EEV assembly • Poor Cond. Pipe sensor assembly / burned	• Check outdoor fan constraint / screened / flow structure • Check if refrigerant overcharged • Check the status of EEV assembly • Check the status of sensor assembly / burn
62	Heat sink Temp, High error	Heat sink sensor detected high temp.(85 °C)	• Part no. : EBR37798101~09 - Check the heat sink sensor: 10 kΩ / at 25 °C(Unplugged) - Check the outdoor fan is driving rightly • Part no. : EBR37798112~21 - Check the soldered condition in the 22,23 pin of IPM, PFCM - Check the screw torque of IPM, PFCM - Check the spreadable condition of thermal grease on IPM, PFCM - Check the outdoor fan is driving rightly
65	Problem in heat sink Temperature sensor	Abnormal value of sensor(Open/Short)	• Check if there is defect of thermistor connector (Open/Short) • Check defect of outdoor PCB(Inverter)
67	Fan lock error	Fan RPM is less than 10 for 5 seconds from start-up operation. Fan RPM is less than 40 in operation except for start-up operation	• Fan motor damage. • Assembly condition abnormal. • Jammed fan by surroundings.
114	Problem in Vapor injection inlet temperature sensor	• Open (Below -48.7 °C)/ Short(Over 96.2 °C) • Soldered poorly • Internal circuit error	• Bad connection of thermistor connector • Defect of thermistor connector (Open/Short) • Defect of outdoor PCB(Outdoor)

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Velocity 2, Brooklands Drive, Weybridge, KT13 0SL

Eco design requirement

- The information for Eco design is available on the following free access website.
  https://www.lg.com/global/support/cedoc/cedoc